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Mariners Weather Log

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Mariners Weather Log

Editor: Elwyn E. Wilson

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Front Cover: The Philippine destroyer escort DATU KALANTIAW lies on her side after being blown aground on Calayan Island by typhoon Clara. A rescue helicopter is overhead. U.S. Navy and Air Force rescue personnel assisted in rescuing 18 of the 97 crewmen on board. Wide World Photo.

The Secretary of Commerce has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through April 1, 1985.

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Mariners Weather Log

WESTERN NORTH PACIFIC TYPHOONS, 1981

Extracted from the Annual Tropical Cyclone Report, 1981, U. S. Naval Oceanographic Command Center, Joint Typhoon Warning Center, Guam, Mariana Islands.

The western North Pacific experienced the third consecutive year of below normal tropical cyclone activity during 1981. Twenty-nine tropical cyclones occurred, one more than the previous 2 yr but three less than the annual average. Only one significant tropical cyclone failed to develop beyond the tropical depression (TD) stage and 11 tropical storms (TS) failed to reach typhoon intensity. Of the 16 tropical cyclones that developed to typhoon (TY) intensity, only two reached the 130 kn intensity necessary to be classified as supertyphoons (ST). Tropical

Table 1.-- Tropical cyclones, western North Pacific, 1981

CYCLONE	TYPE	NAME	PERIOD OF WARNING	CALENDAR DAYS OF WARNING	MAX SFC WIND(KT)	MIN OBS SLP	NUMBER OF WARNINGS	DISTANCE TRAVELLED(NM)
01	TY	FREDA	12 MAR-17 MAR	6	100	940	22	1912
02	TS	GERALD	15 APR-19 APR	5	60	982	18	1659
03	TS	HOLLY	29 APR-07 MAY	9	45	997	31	1711
04	TY	IKE	09 JUN-14 JUN	6	65	967	21	1386
05	TY	JUNE	17 JUN-22 JUN	6	75	965	22	1569
06	TY	KELLY	30 JUN-04 JUL	5	75	966	20	1159
07	TS	LYNN	02 JUL-07 JUL	6	55	983	18	1992
08	TS	MAURY	18 JUL-20 JUL	3	55	990	9	741
09	TS	NINA	22 JUL-23 JUL	2	35	995	4	120
10	TY	OGDEN	27 JUL-01 AUG	6	65	975	20	1542
11	TD	TD-11	31 JUL-02 AUG	3	20	994	7	161
12	TS	PHYLLIS	03 AUG-04 AUG	2	45	978	7	318
13	TS	ROY	03 AUG-09 AUG	7	50	986	20	838
14	TS	SUSAN	08 AUG-13 AUG	6	60	975	19	1180
15	TY	THAD	16 AUG-23 AUG	8	85	965	29	1928
16	TS	VANESSA	17 AUG-19 AUG	3	55	983	8	1299
17	TS	WARREN	18 AUG-20 AUG	3	45	991	10	497
18	TY	AGNES	26 AUG-03 SEP	9	95	947	31	1717
19	TY	BILL	03 SEP-07 SEP	5	85	959	17	1583
20	TY	CLARA	17 SEP-22 SEP	8	120	924	29	2129
21	TY	DOYLE	20 SEP-23 SEP	4	80	964	14	2301
22	STY	ELSIE	23 SEP-02 OCT	8	150	893	33	2447
23	TS	FABIAN	13 OCT-14 OCT	2	45	990	6	1479
24	TY	GAY	14 OCT-23 OCT	10	95	947	35	3390
25	TY	HAZEN	14 NOV-23 NOV	10	100	956	37	2956
26	STY	IRMA	19 NOV-27 NOV	9	135	902	34	2732
27	TS	JEFF	23 NOV-26 NOV	4	35	999	14	1754
28	TY	KIT	11 DEC-21 DEC	11	115	924	40	1902
29	TY	LEE	23 DEC-29 DEC	7	95	948	24	1710
			1981 TOTALS	144*				

* OVERLAPPING DAYS INCLUDED ONLY ONCE IN SUM.

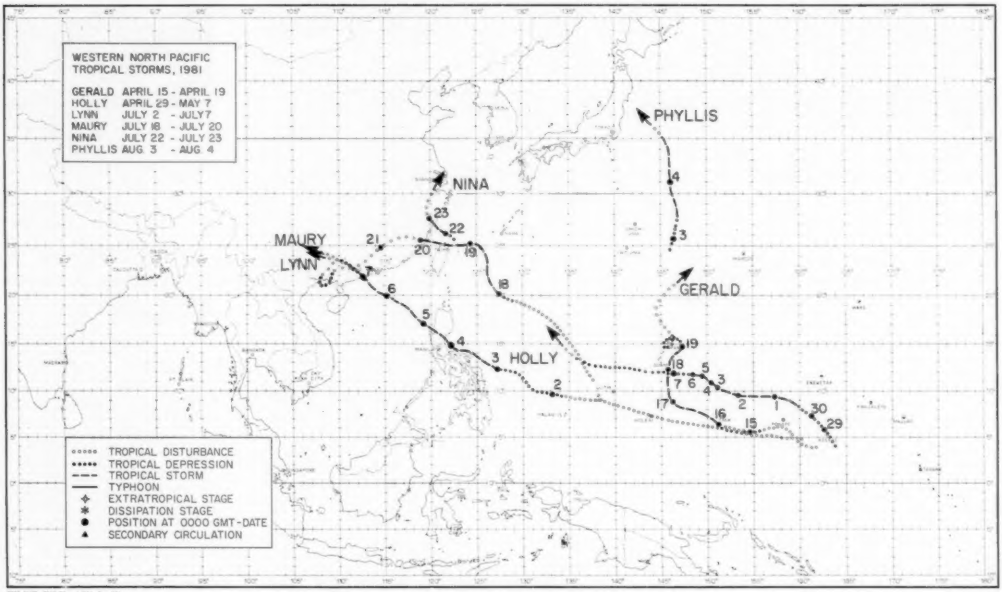

Figure 1.-- Tropical storm tracks, 1981.

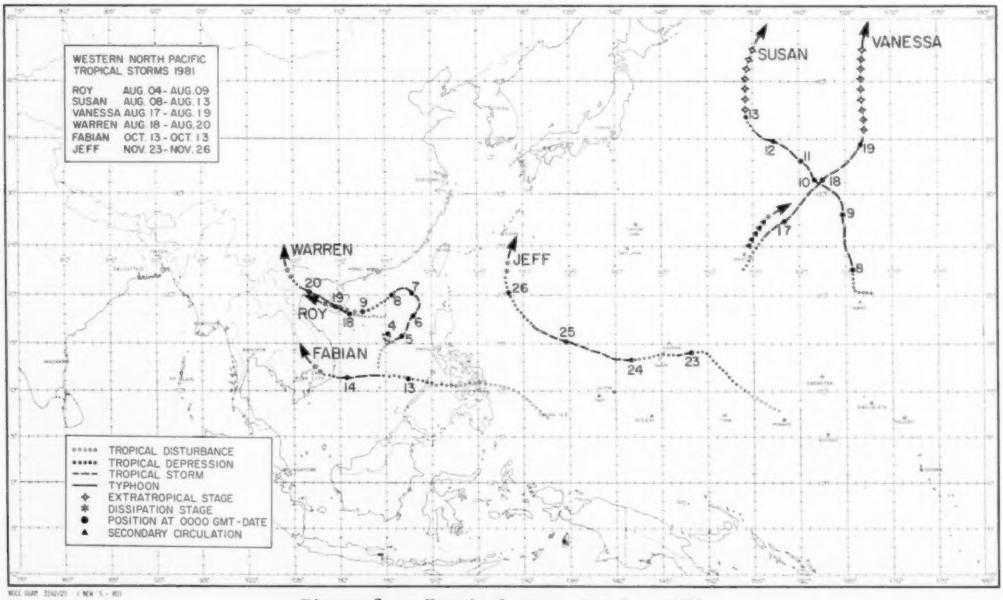

Figure 2.-- Tropical storm tracks, 1981.

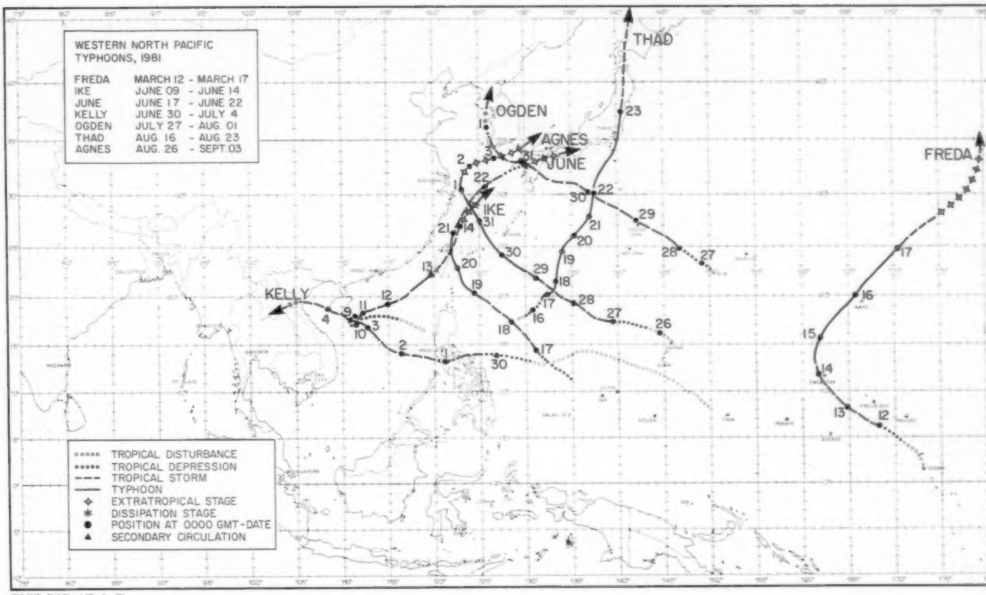

Figure 3.-- Typhoon tracks, 1981.

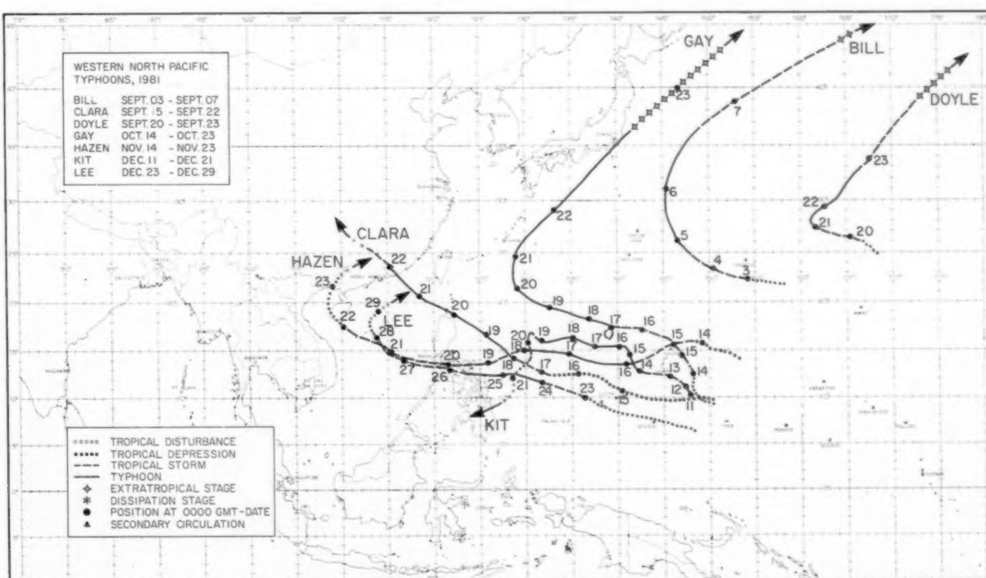

Figure 4.-- Typhoon tracks, 1981.

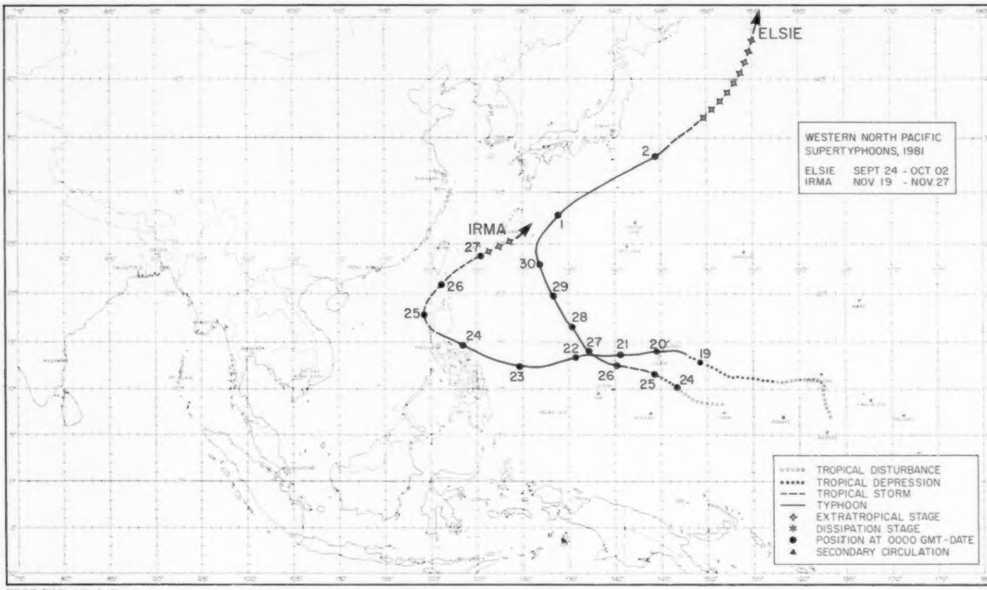

Figure 5.-- Supertyphoon tracks, 1981.

Table 2.-- 1981 tropical cyclone statistics

WESTERN NORTH PACIFIC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	(1959-80) AVERAGE
TROPICAL DEPRESSIONS	0	0	0	0	0	0	1	0	0	0	0	0	1	4.8
TROPICAL STORMS	0	0	0	2	0	0	3	5	0	1	1	0	12	10.0
TYPHOONS	0	0	1	0	0	3	1	2	4	1	2	2	14	17.7
ALL CYCLONES	0	0	1	2	0	3	5	7	4	2	3	2	29	32.3
(1959-80) AVERAGE	.6	.4	.6	.9	1.5	2.0	5.2	6.5	6.0	4.7	2.6	1.4	32.3	

Table 3.-- Frequency of tropical storms and typhoons by month and year

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
AVERAGE (1945-58)	0.4	0.1	0.4	0.5	0.8	1.3	3.0	3.9	4.1	3.3	2.7	1.1	21.6
1959	0	1	1	1	0	0	3	6	6	4	2	2	26
1960	0	0	0	1	1	3	3	10	3	4	1	1	27
1961	1	1	1	1	3	2	5	4	6	5	1	1	31
1962	0	1	0	1	2	0	6	7	3	5	3	2	30
1963	0	0	0	1	1	3	4	3	5	5	0	3	25
1964	0	0	0	0	2	2	7	9	7	6	6	1	40
1965	2	2	1	1	2	3	5	6	7	2	2	1	34
1966	0	0	0	1	2	1	5	8	7	3	2	1	30
1967	1	0	2	1	1	1	6	8	7	4	3	1	35
1968	0	0	0	1	1	1	3	8	3	6	4	0	27
1969	1	0	1	1	0	0	3	4	3	3	2	1	19
1970	0	1	0	0	0	2	2	6	4	5	4	0	24
1971	1	0	1	1	4	2	8	4	6	4	2	0	35
1972	1	0	2	0	1	3	6	5	4	5	2	1	30
1973	0	0	0	0	0	0	7	5	2	4	3	0	21
1974	1	0	1	1	1	4	4	5	5	4	4	2	32
1975	1	0	0	0	0	0	2	4	5	5	3	0	20
1976	1	1	0	2	2	2	4	4	5	1	1	2	25
1977	0	0	1	0	0	1	4	1	5	4	2	1	19
1978	1	0	0	1	0	3	4	7	5	4	3	0	28
1979	1	0	1	1	1	0	4	2	7	3	2	2	24
1980	0	0	0	1	4	1	4	2	6	4	1	1	24
1981	0	0	1	2	0	2	5	7	4	2	3	2	28
AVERAGE (1959-81)	.5	.3	.5	.9	1.2	1.6	4.5	5.4	5.0	4.0	2.4	1.2	27.6

cyclones reaching tropical storm intensity or greater are assigned names in alphabetical order from a list of alternating male/female names. Table 1 provides a summary of key statistics for western North Pacific cyclones. Each tropical cyclone's maximum surface winds (MAX SFC WND), in knots, and minimum observed sea level pressure

Table 4.-- Frequency of typhoons by month and year

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
AVERAGE (1945-58)	0.4	0.1	0.3	0.4	0.7	1.1	2.0	2.9	3.2	2.4	2.5	0.6	[illegible]
1959	0	0	0	1	0	0	1	5	3	3	2	2	17
1960	0	0	0	1	0	2	2	8	0	4	1	1	19
1961	0	0	1	0	2	1	3	3	5	1	1	1	20
1962	0	0	0	1	2	0	5	7	2	4	3	0	24
1963	0	0	0	1	1	2	3	3	3	4	1	1	19
1964	0	0	0	0	2	2	6	3	5	3	4	1	26
1965	1	0	0	1	2	2	4	3	5	2	1	0	21
1966	0	0	0	1	2	1	5	6	4	2	3	1	25
1967	0	0	1	1	0	1	3	4	4	3	3	0	20
1968	0	0	0	1	1	1	1	4	3	5	4	0	20
1969	1	0	0	1	0	0	2	3	2	3	1	0	13
1970	0	1	0	0	0	1	0	4	2	3	1	0	12
1971	0	0	0	3	1	2	6	3	5	3	1	0	24
1972	1	0	0	0	1	1	4	4	3	4	2	2	22
1973	0	0	0	0	0	0	4	2	2	4	0	0	12
1974	0	0	0	0	1	2	1	2	3	4	2	0	14
1975	1	0	0	0	0	0	1	3	4	3	2	1	15
1976	1	0	0	1	2	2	2	1	4	1	1	0	15
1977	0	0	0	0	0	0	3	0	2	3	2	1	11
1978	0	0	0	1	0	0	3	2	4	3	2	0	15
1979	1	0	1	1	0	0	2	2	3	2	1	1	14
1980	0	0	0	0	2	0	3	2	5	2	1	0	15
1981	0	0	1	0	0	2	2	2	4	1	2	2	16
AVERAGE (1959-81)	.3	0.04	.2	.7	.8	1.0	2.8	3.1	3.3	3.0	1.6	.6	[illegible]

(MIN OBS SLP), in millibars, were obtained from best estimates based on all available data. The distance travelled, in nautical miles, was calculated from the Joint Typhoon Warning Center (JTWC) official best track.

Tables 2 through 4 provide further information on the monthly distribution of tropical cyclones and statistics on Tropical Cyclone Formation Alerts and Warnings. The number of warning days were 144, an increase from 128 in 1980 and slightly less than 149 in 1979. There were 23 days with two cyclones and 3 days with three or more cyclones.

The cyclone tracks are shown in figures 1 through 5. The tracks are shown from first detection until dissipation or becoming extratropical. In tables 3 and 4 the storms are

credited to the month that the first warning was issued. Numbers in some past year's tables may disagree, as some indicated month of first detection. Maximum winds are estimates of sustained speeds for a 1-min average.

Individual typhoons are described in the following narratives. Times are GMT unless otherwise indicated. Tropical storm summaries may be found in Hurricane Alley of the appropriate issue of the Mariners Weather Log.

TYPHOON FREDA

Typhoon Freda, the first tropical cyclone of 1981 and only the fourth typhoon since 1959 to occur in March, developed very slowly within the near-equatorial trough that shifted briefly north of the equator in early March.

The disturbance remained quasi-stationary near the Gilbert Islands for nearly 3 days, and finally began to move northwestward and develop slowly as it reached higher latitudes. The first warning on TD 01 was issued at 0000 on the 12th as the disturbance approached the southern Marshall Islands when synoptic reports and satellite imagery indicated further development.

Strong southeasterly flow aloft resulted in considerable vertical tilt during Freda's northwest track. The 700-mb center was consistently observed 15 to 25 mi north-northwest of the surface center. This poor vertical alignment combined with the absence of strong upper-level outflow channels resulted in her extremely slow intensification. This proved fortunate for Enewetak Atoll which lay directly in Freda's path. Freda passed 15 mi west of the Atoll with 55 kn sustained winds. Although no synoptic observations or damage reports were received from Enewetak, the situation could have been far more disastrous.

In contrast to the extremely slow development during the first three days of her existence, Freda intensified rapidly once north of the mid-tropospheric subtropical ridge axis and in a more favorable upper-level environment. Contact with the southwesterly jet north of her provided a vigorous outflow channel. Freda intensified from 65 kn to 100 kn and deepened from 975 mb to 940 mb within 30 hr (fig. 6).

Freda was at her maximum intensity of 100 kn when she passed within 65 mi of Wake Island. Wake reported maximum sustained winds of 50 kn with gusts to 75 kn at 15/2300. Damage to the island's runway and support equipment was extensive, caused primarily by the high surf, estimated to be over 20 ft, generated by Freda's close passage.

As Freda moved farther north and approached the core of the jetstream, the strong mid-latitude westerlies responsible for her rapid intensification also caused her eventual weakening. Forty-eight hours after reaching maximum intensity, Freda's convection was sheared off and the low-level circulation moved quickly northward and was absorbed into a developing extratropical low pressure system.

TYPHOON IKE

Typhoon Ike was one of several recent examples of tropical cyclone development over the South

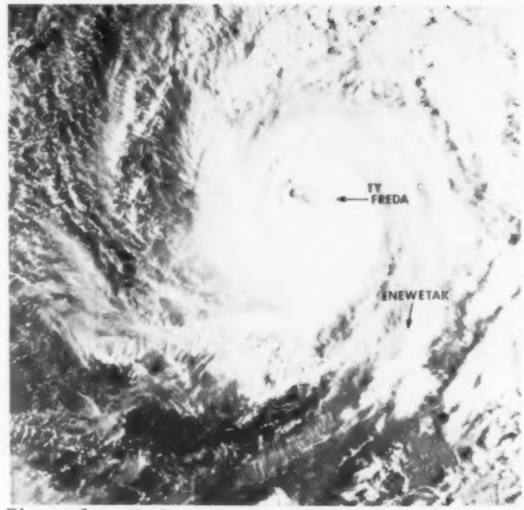

Figure 6.— Typhoon Freda at 80-kn, 390 mi southwest of Wake Island, March 14, 1981.

China Sea during the end of the monsoonal transition season. Several characteristic features have often been observed by JTWC forecasters both in the tropical cyclogenesis and during the lifetime of the system as a tropical storm and typhoon. These include:

- The system becomes initially evident on satellite imagery as a mid-tropospheric monsoonal depression with fluctuating associated convection.

- The system is often initially slow to develop a closed surface circulation, despite persistent associated convection.

- The system is also slow to intensify, even after evidence of surface development.

- The system frequently maintains a broad asymmetrical wind distribution throughout its life cycle.

- The system is usually short-lived, with repeated interactions with nearby land masses.

Ike was typical of this pattern and displayed all the above characteristics during his development. The first evidence that Ike might develop occurred on June 8, as the 0000 surface analysis indicated relatively lower surface pressures just west of the Philippine Islands. Based on this data, and satellite imagery which indicated continued convective support, an alert was issued at 0600.

Ike had a difficult time persisting as a tropical cyclone as steady upper-level shear displaced Ike's 700 mb center as much as 60 mi southwest of the surface circulation. Finally, on June 9, Ike moved into an area of decreased shear aloft, which allowed vertical alignment to intensify the system. Ike reached tropical storm intensity at 10/0000. In the meantime, a mid-

latitude, mid-tropospheric trough over Asia continued moving eastward, and Ike accelerated to the northeast, steered by the increasingly strong southwesterly flow.

Only one aircraft reconnaissance mission was able to penetrate Ike due to geographical and political constraints. This aircraft fixed Ike near the storm's peak intensity just prior to landfall over Taiwan. The crew reported that Ike's minimum sea-level pressure had decreased to 967 mb, 700 mb winds of over 60 kn were measured, and aircraft radar indicated partial eyewall formation. Based on the above data, it was concluded in post-analysis that Ike reached minimal typhoon intensity near this time. Less than 12 hr later, Ike moved ashore over southwestern Taiwan.

Ike weakened significantly while traversing Taiwan but emerged over open water north of Taipei around 13/1500. Ike became an extratropical low at 14/0000.

Subsequent press releases reported minor damage over Taiwan due to heavy rains and flooding. Eight storm-related fatalities were reported, four from Taiwan and four from the Philippine Islands.

TYPHOON JUNE

The process for genesis of tropical cyclones through interaction with a tropical upper tropospheric trough (TUTT), was evident during the early development stages of Typhoon June. A TUTT was established over the Philippine Sea early in June leading to the generation of a tropical disturbance over the Palau Islands. On the 13th a cell within the TUTT was observed on satellite imagery. By the 15th the TUTT cell was northwest of a disturbed area and the potential for development of a tropical cyclone was greatly improved.

The disturbance then developed an outflow aloft and banding features were evident on satellite imagery of 17/0600. At that same time aircraft reconnaissance also found that the disturbance had tropical storm strength winds.

It is interesting to note that the TUTT cell which helped form June moved ahead of her along a parallel track until she hit Taiwan. June maintained a position southeast of the TUTT cell throughout this period. Further, June intensified to a maximum of 75 kn while tracking behind the TUTT cell as she hit Taiwan.

Radar observations at Hua-Lien provided essential information to JTWC when June began to deviate from a northward direction toward a point 40 mi southeast of Taipei. Figure 7 is a picture of the radar presentation taken at Hua-Lien at 0500 on the 20th, when June had an intensity of 75 kn 9 hr before landfall.

June began to weaken gradually after recurvature. A 500 mb anticyclone that had formed over China and allowed June to recurve, moved southward as a trough approached China's coast. As June neared Japan, she began to interact with a weak frontal system extending southwestward and entrain cold air supplied by the trough. At 1200 on the 22d the final warning was issued on June as she became extratropical before tracking over Kyushu.

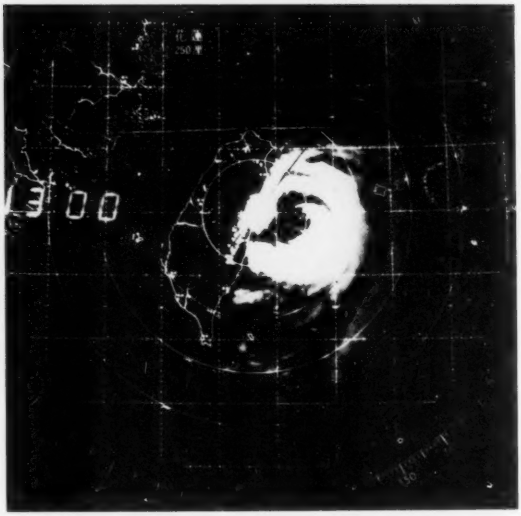

Figure 7.-- June as she appeared on the Hau-Lien radar 0500 June 20. Photo courtesy of the Central Weather Bureau, Taipei, Taiwan.

TYPHOON KELLY

The disturbance which became Typhoon Kelly was first detected by satellite imagery on June 25 northwest of Truk Atoll. The next 4-day period was marked by often impressive organization on satellite imagery with little or no evidence of a surface circulation center. However, with synoptic data at 29/1200, it became increasingly evident that a surface center had established itself.

The successful launch of NOAA 7 in June 1981 afforded JTWC the opportunity to receive local afternoon surveillance from a high resolution polar-orbiting satellite platform. At 0447 on the 25th, while NOAA 7 was in its 17th orbit, a disturbance was located just northwest of Truk. The visual imagery on the 27th from NOAA 7, yielded a Dvorak intensity classification of T2.5 (35 kn).

At 1200 on the 28th, satellite imagery once again showed an area of increased convection centered near 14°N, 135°E. The first warning on TD-06 was issued at 0000 on the 30th.

Synoptic observations from reporting stations along the southeastern coast of Luzon and Catanduanes Island indicated that TD-06 made landfall at, or near, tropical storm strength, at 30/1200 and was upgraded to Tropical Storm Kelly. As Kelly tracked over the central Philippines, the low-level circulation pattern became disrupted and the observed wind speeds lessened, so that by 31/0000, Kelly was downgraded to TD-06. TD-06 tracked directly over Mindoro Island and despite having lost some of its earlier intensity, the combined effects of heavy rains, flooding and mudslides left thousands homeless and nearly 200 dead.

Within hours after TD-06 moved into the South China Sea, it regained its low-level circulation

pattern and resumed its interrupted intensification trend. At 1800 July 1 TD-06 was upgraded to Tropical Storm Kelly. In post-analysis, Kelly first attained tropical storm strength at 30/0600, was downgraded at 30/1800 and was upgraded at 01/0600. This is fairly typical of post-storm analysis since the supporting synoptic data are received at JTWC after the warning has been issued for the synoptic hour; thus, the upgrading and downgrading usually follow on the next warning.

At 0000 July 2, while moving to the northwest, Kelly was upgraded to typhoon strength. The 03/0300 surface observation from the Paracel Islands indicated southeasterly winds of 74 kn and a sea-level pressure of 970.8 mb. It was during this period that Kelly is assumed to have reached his maximum intensity of 75 kn. Subsequent satellite imagery indicated weakening convection with cirrus occasionally masking the eye. By 03/1800, Kelly had reached the southeastern portion of Hai-nan Island and the eye was no longer evident on satellite imagery. Landfall occurred about 100 mi south of Hanoi at 04/1800. The last satellite fix received for the remnants of Kelly was at 05/0000, positioned along the Vietnam-Laos border.

TYPHOON OGDEN

Typhoon Ogden developed near 23°N, 151°E, when a circulation formed under a pre-existing convective area.

The initial warning carried a gradually recurving track to the east of Japan. This forecast was based on the apparent existence of a break in the 500 mb ridge to the northwest and the approach of an apparently significant trough in the westerlies. Forecast aids were in disagreement on the forecast track. Climatology and the current synoptic situation influenced the choice of a recurving track over a northwest to westerly straight track. Three warnings were issued with the recurve forecast before a change to straight northwest movement was decided upon. The change was precipitated by two things: synoptic data showed the approaching trough was not as strong as anticipated, and the ridge to the north was building westward ahead to TD-10. No further changes in track were required as TD-10 responded well to the steering currents on the south side of the ridge.

Favorable outflow conditions were never established for TD 10 and this perhaps explains the very gradual intensification. Twenty-four hours after TD 10 formed, tropical storm strength was reached, however, it took another 60 hr for then tropical storm Ogden to reach its maximum intensity of 65 kn thus becoming a minimal typhoon (fig. 8). Ogden was upgraded to typhoon in post-analysis based on a combination of aircraft and land synoptic data.

Ogden crossed southern Kyushu between 30/1600 and 30/2100 and weakened significantly. Ogden still possessed tropical storm strength winds when it emerged into the East China Sea. Weakening continued as Ogden headed northwest toward Cheju-Do Island and the Korean Peninsula. Succumbing to upper and mid-level shear, Ogden finally dissipated as a significant tropical cyclone over the Yellow Sea along the west coast of Korea.

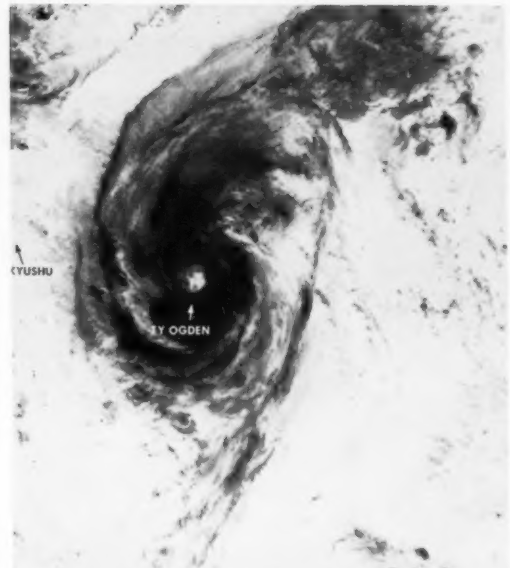

Figure 8.-- Ogden at 0957, July 30, at near maximum intensity of 65-kn, as seen by NOAA 6 infrared imagery.

TYPHOON THAD

The monsoon trough was particularly active in mid-August, and within the 48 hr period beginning August 16 three tropical cyclones were spawned. Typhoon Thad, the first of the three, was initially evident on August 10 when surface synoptic data indicated a weak circulation was embedded in the trough near 18°N, 130°E. The circulation was first cited on August 15 when satellite imagery indicated limited outflow had developed above the surface circulation. The outflow was initially the result of a 200-mb ridge that had built westward over the surface trough. Aircraft reconnaissance data located a circulation near 19°N, 132°E. Analysis of 16/0000 200 mb synoptic data showed that an anticyclone had developed in the ridge over the circulation, enhancing the outflow pattern necessary for further intensification of the disturbance. Satellite imagery eventually indicated better organization of the system, thus the first warning on TD-15 was issued on the 16th. By 18/0000 Thad had reached typhoon strength and developed a ragged eye that remained for 80 hr (fig. 9).

As Thad neared 30°N, analysis of 500 mb data established the likelihood that Thad would interact with a progressing long wave trough just south of Japan, where recurvature and subsequent acceleration were expected. Post-analysis has revealed several deficiencies in that conclusion: the trough did move eastward over the Sea of Japan late on July 21; a rapidly building ridge east of Thad caused the trough to stall northwest of Thad; coincident with the stalling long wave, a weak short wave moved through the trough and caused a rapid, unforecast, deepening. The entire trough system generated 500-mb height drops of up to 100 m in 12 hr. This rapid deepening,

Figure 9.-- Visual NOAA 6 satellite image of Thad at 2259 August 20 with 80-kn winds and a ragged eye.

combined with high pressure in the ridge to the east, established an intense 500-mb pressure gradient over eastern Japan with resultant wind speeds as high as 65 kn. Thad tracked northward under the influence of the 500 mb flow and was entrained into this area of high winds early on August 22 and accelerated very rapidly to the north over eastern Japan. Thad's speed of advance accelerated from 10 kn at 0000 on the 22d to 45 kn by 0000 on the 23d.

Post-analysis has shown Thad started a very rapid extratropical transition near 32°N that continued as the system accelerated along the eastern side of the trough. The rapid acceleration, and an associated rapid entrainment of cool-dry air, completed the transition by 23/1200, at which time satellite imagery indicated Thad had merged with the trough over the Tatar Strait and was no longer discernible as a tropical entity.

TYPHOON AGNES

On August 26 a reconnaissance aircraft investigated a developing system north of Guam. The 26/0000 synoptic data indicated a possible low-level center approximately 150 mi northwest of Guam. The investigating aircraft located a 1006-mb surface center 215 mi northwest of Guam. Satellite imagery showed improving convective organization and, at 1800, the first warning was issued for tropical depression 18.

On the 27th TD-18 was upgraded to tropical storm Agnes when aircraft reconnaissance data showed a 994-mb sea-level pressure at the center and measured winds of 46 kn at flight level (1500 ft). While moving toward the west-northwest and intensifying along climatological norms, Agnes was upgraded to a typhoon at 0000 on the 29th. Agnes passed 90 mi southwest of Okinawa and then began a turn toward the north along the western periphery of the subtropical ridge. At 31/0000, 170 mi northwest of Okinawa, Agnes reached a peak intensity of 95 kn which was maintained for 12 hr.

The forecast scenario had anticipated Agnes would interact with a mid-latitude trough south of Korea and then accelerate northeastward. However, as Agnes moved north of 30°N, there was no evidence of the anticipated acceleration; instead, there was increasing evidence that Agnes was losing much of her deep-layered convection and a premature extratropical transition was underway. In post-analysis it was determined that Agnes had lost much of her tropical characteristics by 1800 September 1. However, since there were no aircraft or synoptic data close to Agnes to confirm this apparent transition, warnings were maintained until 03/0600 at which time synoptic data from Jeju-Do confirmed Agnes' character and the threat as a significant tropical cyclone to Korea and Japan had passed. Much of the southern portion of South Korea was being inundated with the heaviest recorded rainfalls in this century, up to 28 in. This adverse weather preceded the low-level center as the heavy rains and thunderstorms were sheared northeastward over Korea. Because most of the earlier forecasts had predicted Agnes moving over this region by this time, much of the potential damage from these rains may have been averted by the precautions taken well before the heavy rainfalls and flooding began.

TYPHOON BILL

Without the benefit of satellite data typhoon Bill may have gone undetected since the initial disturbance formed 295 mi east-southeast of Marcus Island and only came within 120 mi of that island at 0600 on September 3. The disturbance was never discernible in the synoptic data observations from Marcus Island. Bill remained a compact system throughout its duration (fig. 10).

Unlike larger storms which tend to create their own environment and move sub-tropical systems out of their way, Bill reacted to the environment and maintained a tight gradient between himself and an anticyclone until he was north of 28°N at 05/1200, where weakening began. Once this occurred, the maximum observed wind speeds correlated quite well with wind/pressure relationships until extratropical transition occurred.

First detected at 0000 September 1, Bill's convection covered a small area of approximately 150 mi in diameter, and had an associated small mid-level cyclonic circulation. This mid-level system slowly built down to the surface and then deepened rapidly. Environmental pressures were generally near 1009 mb; however, aircraft reconnaissance at 03/0807 found a 993-mb central pressure and winds of 70 kn northeast of the center. The Atkinson and Holliday wind/pressure relationship indicates that a 993-millibar central pressure would support a mean maximum wind of 45 kn. The higher wind speed in Bill was the result of an extremely tight pressure gradient

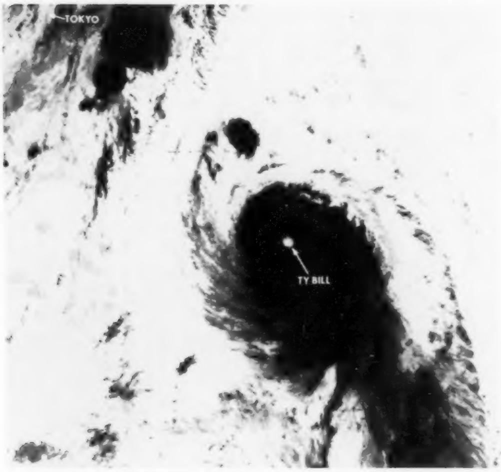

Figure 10.--Compact typhoon Bill with 85-kn winds was at peak intensity at 1724 September 5. NOAA 7 infrared image.

between the storm and a subtropical ridge to the northeast.

TYPHOON CLARA

Clara was first detected on satellite imagery at 1600, September 11 near Ponape as an area of concentrated convection embedded within the monsoon trough. As Clara tracked westward it became apparent that the potential for significant development would increase as it moved into the upper level divergent area induced by a Tropical Upper Tropospheric Trough northwest of Guam.

After passing about 210 mi south of Guam, slow but steady intensification took place as a 200-mb anticyclone became evident over the disturbance based on streamline analysis of September 15. Clara continued to track west-northwestward and attained tropical storm intensity by 1800 on the 16th.

Clara intensified rapidly as she attained her maximum surface winds of 120 kn 6 hr prior to crossing the northern tip of Luzon at 19/2200 (fig. 11). Upon entering the South China Sea it became apparent that Clara was not going to

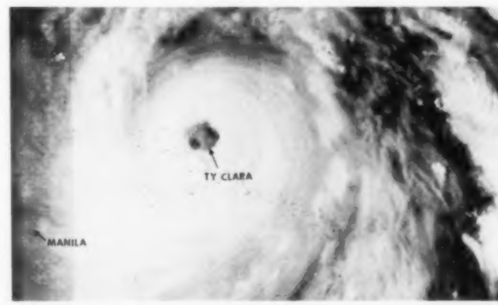

Figure 11.-- Typhoon Clara on the 19th at 115-kn 16 hr from northern Luzon as viewed by NOAA 7.

Figure 12.-- The Philippine Navy Destroyer DATU KALANTIGAW aground on Calagan Island. U.S. Navy personnel can be seen on board during recovery operations. U.S. Navy Photo by PH2 P.B. Soutar.

recurve because an anticyclone over southeast China had moved northeastward displacing a weakness west of Taiwan and preventing recurvature to the north. Clara responded to these changes and remained on a northwest track making landfall 140 mi east-northeast of Hong Kong at 21/2000. After making landfall Clara dissipated rapidly as she accelerated inland into hilly terrain.

Clara was a devastating storm as she crossed northern Luzon causing widespread damage and loss of life in eight northern Luzon provinces. Torrential rains caused floods which left thousands homeless and caused extensive damage to property and crops. A Philippine Navy destroyer and a cargo ship sank 330 mi north of Manila leaving 68 persons missing (fig. 12).

TYPHOON DOYLE

Typhoon Doyle was the second midget storm of the 1981 season and followed typhoon Bill by less than 3 wk. Doyle and Bill were very similar in size, intensity and track. Doyle was also unusual in that all of the warnings were based on satellite imagery analysis.

Doyle was first detected as an apparent mid-to-upper-level disturbance early on September 18 near 25°N, 178°E. The disturbance built down to the surface as it drifted westward. The first warning was issued on the 20th based upon Dvorak analysis of visual satellite data which indicated that tropical storm Doyle had an estimated intensity of 35 kn.

Doyle initially tracked west-northwestward then recurved around a mid-tropospheric anticyclone. As Doyle recurved he became entrained in strong westerlies and accelerated rapidly northeastward. Doyle then started to weaken over the cooler waters north of 30°N, finally losing tropical characteristics near 39°N, 172°E, when the system merged with an existing front. Typhoon Doyle was never larger than 180 mi in diameter, even though the maximum intensity was 80 kn.

SUPER TYPHOON ELSIE

Following the northward progression of Typhoons Clara and Doyle, the near equatorial trough became very weak and diffuse with very few areas of concentrated convection for several days. There was a small convective area, approximately one degree in diameter near 8°N, 150°E, on the 22d with a weak but well defined associated circulation. Satellite data showed a fairly well organized upper-level anticyclone (ULAC) located above the low-level circulation. An aircraft reconnaissance mission located the low-level circulation.

Typhoon Elsie (figs. 13 and 14) was a well-behaved cyclone. She reached tropical storm strength late on September 24 and 24 hr later was a typhoon. For the first 3 days she tracked west-northwestward under the influence of a subtropical 500-mb ridge to the north. By the 27th she was curving toward the northwest and at 1200 reached supertyphoon force of 135 kn. Elsie gradually curved to a north-northwest track and reached her maximum of 150 kn at 0000 on the 28th. Her minimum observed sea level pressure was 893 mb. Reconnaissance aircraft took 29 fixes between September 24 and October 1. By 0600 on the 29th Elsie was below supertyphoon intensity at 130 kn, and on the 30th recurved to the northeast. She passed about 200 mi southeast of Tokyo late on October 1 and was extratropical by 0600 on the 2d. The container vessel PRESIDENT JEFFERSON encountered extratropical Elsie on the 3d and lost containers overboard.

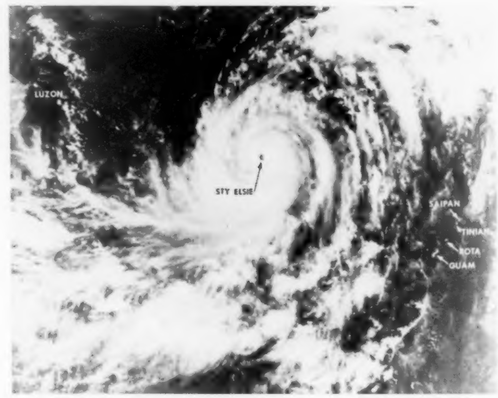

Figure 13.--Supertyphoon Elsie had reached 150-kn intensity at 0520 on the 28th when this NOAA 7 visible image was sensed. She was 615 mi west-northwest of Guam.

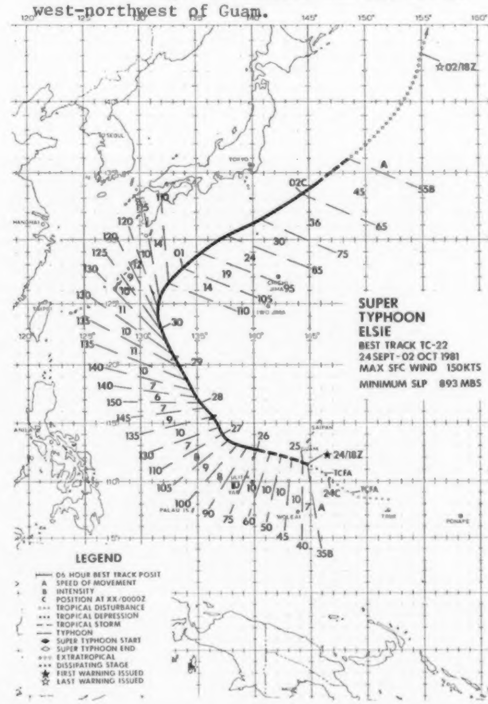

Figure 14.-- Elsie's track showing maximum winds and speed of movement.

TYPHOON GAY

Typhoon Gay was a harbinger of good tidings

for the island of Okinawa, providing 5.89 in of rain as she passed some 95 mi to the southeast. Locked in a severe drought, Okinawa residents had been suffering under strict water rationing.

From its inception within an abnormally large convective area Gay was far from a straight forward system. Early satellite fixes were very unreliable, resulting in the vectoring of aircraft reconnaissance to the wrong portion of the convective area. Post-analysis has shown the actual "center" of the developing system was far to the west-southwest of where it was believed to be.

As Gay became better organized she became somewhat more predictable, with a forecast for a generally westward track and for an eventual recurvature around the west side of the prevailing mid-tropospheric anticyclone. Gay reached tropical storm intensity on October 14 east of Guam and made a loop near 17°N, 139°E on the 17th. She was typhoon intensity coming out of the loop later in the day.

Typhoon Gay remained a fickle system until reaching maximum intensity of 95 kn when a large eye finally developed. Until this time, the center of Gay was characterized by an unusually large area of light and variable winds, further contributing to the problems of accurate location.

Following recurvature and passage to the east of Okinawa, Gay continued around the western side of the mid-Pacific anticyclone and accelerated toward Japan. Eventually passing within 30 mi of Tokyo, Gay brought extensive rainfall to the central regions of Japan. Yokosuka Naval Facility reported peak gusts of 60 kn and 9.38 in of rain over the 24 hr period of Gay's passage.

A low pressure system north of Japan rapidly drew Gay northward and quickly initiated an extratropical transition with Gay merging completely with the existing low center.

TYPHOON HAZEN

A disturbance associated with enhanced convection began to develop in an elongated trough east of Guam on November 12.

Aircraft reconnaissance data at 14/0000 found a closed circulation with maximum surface winds of 35 kn, thus the disturbance became tropical depression 25. Aircraft reconnaissance later that evening reported the surface pressure had dropped to 990 mb, prompting upgrading to tropical storm Hazen with estimated maximum winds of 40 kn. Satellite imagery at this time showed the development of an intense, 150 mi diameter, convective mass.

Tropical Storm Hazen's southwestward path took it over the northern tip of Saipan between 0300 and 0600 on the 15th. Maximum sustained winds of 35 kn with gusts to 62 kn were reported by the Saipan weather office. Minor structural damage and many downed trees and power lines were reported.

Hazen then passed 60 mi north of Guam at 1200 and began a more westerly movement. Winds near the center were estimated to be 55 kn at this time but only the weaker southern quadrants passed over Guam, where winds of 15 kn were reported with some heavy showers.

Hazen was upgraded to typhoon strength at 1800, 3 hr before aircraft reconnaissance reported surface pressures of 957 mb and estimated surface winds of 90 kn. After passing Guam, Hazen rapidly intensified to his maximum intensity of 100 kn as it followed the more westward track. Early on November 17 Hazen began to interact with a midlatitude trough and was drawn northwestward into an area of increased vertical wind shear. Hazen weakened as the upper-level outflow channels to the north diminished. As the trough passed to the east, Hazen resumed westerly movement and reintensified.

As Hazen approached the Philippines a slow weakening occurred as part of his circulation was interrupted by the mountainous terrain of the islands south of Luzon. Hazen passed just south of Catanduanes Island at 19/1200 and entered the South China Sea 18 hr later. Highest recorded winds were 65 kn at Catanduanes Island. As Hazen entered the South China Sea no intensification occurred over the warm water due in part to the severe interactions between the low-level circulation and the mountainous terrain of southern Luzon; the loss of strength just could not be overcome. Hazen continued to weaken as he tracked toward Hanoi, eventually making landfall 150 mi east-northeast of Hanoi and then dissipated over the hilly terrain of southeast China.

SUPER TYPHOON IRMA

Super Typhoon Irma was the second of three tropical cyclones (Hazen, Irma, and Jeff) to form in an active equatorial trough between 150°E to 170°E near 10°N during the middle weeks of November. Reaching a maximum intensity of 135 kn and a minimum sea-level pressure of 902 mb, Irma was the strongest of the three storms, and fortunately, also the best "behaved" and the easiest to forecast.

When the area of enhanced convection that eventually became Typhoon Hazen formed near 10°N, 165°E on November 10, a zone of strong convective activity, located between 8°N and 10°N, stretched eastward from 165°E to 150°W. During the follow-

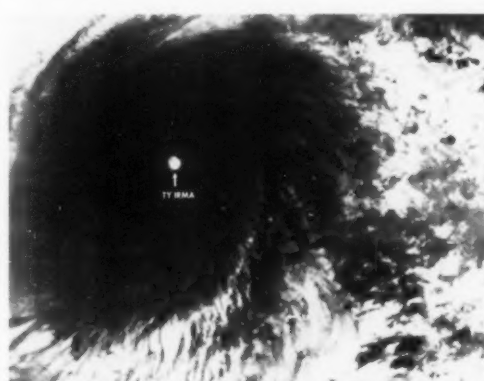

Figure 15.--Supertyphoon Irma near maximum intensity at 0450 on the 22d. Four hours later the eye was described as an "...excellent stadium effect (with) layered clouds up to an overhead fishbowl...". NOAA 7 infrared image.

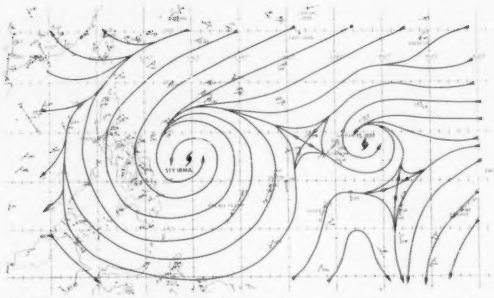

Figure 16.-- Surface/gradient streamline analysis for 23/0000 showing the low-level flow into supertyphoon Irma and tropical storm Jeff.

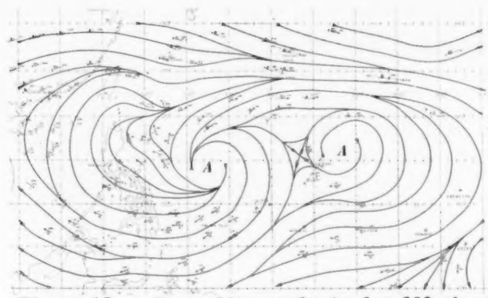

Figure 17.-- Streamline analysis for 200-mb at 22/1200. Note the broad ridge and strong outflow over Irma as compared to Jeff.

Figure 18.-- The Philippine ship REYNA FILIPINA begins to list in the shallow waters of Manila Bay on the 24th, a victim of typhoon Irma,which hit the Islands with 110-kn winds. Crewmembers are standing on the side of the hull after she rolled over. No one was reported injured. Wide World Photo.

ing week, westward propagating cloud clusters supported by convergence in the low-level easterly flow plus a strong upper-level divergent pattern, could be seen forming and dissipating along the entire zone.

The convective disturbance that spawned Super Typhoon Irma was first mentioned in an advisory on November 15 but did not develop significantly until the 18th. The following morning, an aircraft investigative mission found a central sea-level pressure of 1003 mb with 30 kn winds and the first warning was issued on tropical depression 26 at 19/0000.

Tropical storm Irma passed just north of Guam at 18/2230. Fortunately, at this time, the storm was intensifying very slowly and the strongest winds were away from Guam, in the northeast quadrant. In fact, Guam did not receive its strongest winds until nearly 8 hr later (29 kn with gusts to 43 kn, at the Naval Air Station, Agana) when the storm began to deepen west of Guam.

Based upon the experience gained from Typhoon Hazen, JTWC's initial forecast tracks ignored the temptation to forecast an early recurvature into an advancing front just north of Guam. It was deemed, that as in the case for Hazen, the strongest westerly winds associated with the front would pass too quickly to affect the storm.

When the frontal system passed Irma and moved off to the east, the ridge at 500 mb built to the north and west of the storm. This ridge persisted along 18°N throughout Irma's track toward the Philippines. Although the ridge was quite narrow and elongated, it appeared to shelter Irma from the effects of the strong westerly flow north of 20°N. JTWC was able to monitor the strength of this ridge with the aid of several 500 mb synoptic tracks flown by the 54th Weather Reconnaissance Squadron.

The 2254 on the 20th weather reconnaissance mission found that Irma's pressure had dropped to 968 mb with 68 kn surface winds (85 kn, 700-mb flight-level winds) and that a 40 mi diameter eye had developed. In post-analysis, Irma was upgraded to typhoon status at 20/1800. By 21/0900, aircraft data was applied to JTWC's empirically derived relationship between sea-level pressure and 700 mb equivalent potential temperature and suggested the potential for rapid deepening below 925 mb within the next 12 to 36 hr. Twenty-four hr later, the aircraft reconnaissance mission verified this prediction with a 905-mb minimum sea-level pressure, low enough to qualify Irma as a Super Typhoon (fig. 15). Irma remained at super typhoon strength for near 16 hr before slowly weakening as the western half of the circulation field began to interact with the outer edges of the Philippine Islands (figs. 16 and 17).

Although Irma steadily weakened before making landfall at 24/0900 with 85 kn winds about 60 mi northeast of Manila, she still caused widespread destruction. Reports from the Philippines indicated more than 200 deaths with hundreds injured and a damage estimate as high as $9 million. This included the almost total destruction of four coastal towns in the province of Camarines Sur, 170 mi southeast of Manila, due to 50 ft storm surge waves and the capsizing of a ship in Manila Bay (fig.18).

Irma lost her typhoon strength winds at 24/1200 just before entering Lingayen Gulf and the South China Sea. Aircraft reconnaissance 10 hr later found the storm moving north and poorly organized with strong convection and winds only on her north side. By 25/0900, Irma's upper-levels began to shear towards the northeast and Irma began to recurve into the Luzon Straits in advance of a trough moving off of Asia. Irma managed to linger on for another 2 days before finally becoming absorbed into a cold front on the 27th just south of the Ryukyu Islands.

TYPHOON KIT

Typhoon Kit was unlike most December tropical cyclones in that it had a prolonged lifetime (40 warnings) and attained a maximum intensity well over 100 kn. Kit's origin was not uncommon for late season tropical cyclones; during early December, the winter near-equatorial trough had established itself south of 10°N as the tradewind easterlies merged with northeasterlies from higher latitudes placing the westernmost extension of the trough in the Philippine Sea.

Reconnaissance aircraft found closed off circulation center near 10°N, 148°E early on the 11th and the first warning on tropical depression 28 was issued. The 1200 warning upgraded TD-28 to tropical storm Kit based on aircraft data which indicated tropical storm strength winds in all four quadrants.

A westward track was anticipated taking Kit just south of Guam and all reconnaissance aircraft were evacuated to Clark AB after the 12/0849 fix to avoid the expected destructive winds on Guam. As a result, warnings issued during the ensuing 25 hours were based entirely on satellite data. Thus, nighttime infrared imagery had to be scrutinized for subtle details which could help locate the low-level center. Thanks to the

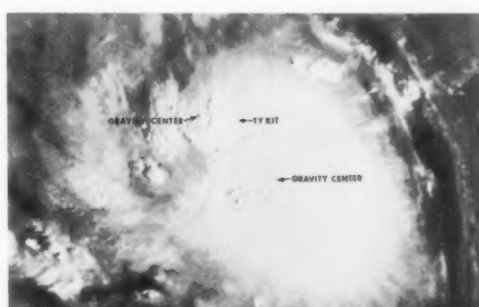

Figure 19.-- Typhoon Kit 165 mi west of Guam. Note the textured cloud pattern, often referred to as gravity waves. These are frequently seen in rapidly developing tropical cyclones prior to development of an eye. NOAA 6 visual image.

efforts of satellite operations personnel from Detachment 1, 1WW, Nimitz Hill, Guam, the fixes received during this period were highly accurate.

Just after Kit passed south of Guam, reconnaissance aircraft indicated a central pressure of 992 mbs which revealed that no appreciable development had taken place during the 25 hr period between aircraft penetrations. However, during the 2 days that followed, Kit intensified and reached a peak of 105 kn before weakening slightly to 95 kn on the 16th. Figure 19 shows Kit early in this intensification period.

Kit turned sharply northward on the 14th but was headed westward again on the 16th. Following the resumption of a westerly track, Kit began to reintensify as she moved into a position that allowed strong upper-level westerlies to provide an excellent outflow channel to the northeast. At 17/0830, a reconnaissance aircraft measured a 924-mb central pressure, or approximately 115 kn maximum winds. During the next two days, Kit steadily weakened and by 19/1800, had lost typhoon force winds. Kit was downgraded to a depression on the 20th and the final warning was issued at 0000 on the 21st.

TYPHOON LEE

On December 21, as Kit was dissipating in the western Philippine Sea, an area of convection began organizing west of Truk Atoll. Strong northerly winds, previously feeding into Kit, began moving toward the eastern Philippine Sea, thus closing the western end of the near-equatorial trough southwest of Guam. At 22/2100, Yap reported a 5-mb pressure fall in a 9 hr period.

TD-29 was upgraded to Tropical Storm Lee at 0600 on the 23d. Lee moved west-northwestward in response to a mid-latitude shortwave trough moving off of Asia. Once this trough moved on, Lee turned toward the west into the Philippines. Lee intensified rapidly, reaching typhoon strength at 0000 on the 24th and, subsequently, attaining a peak intensity of 95 kn. Shortly after reaching maximum intensity, Lee began crossing the Philippines and a rapid weakening trend followed. Just 24 hr after reaching 95 kn, Lee entered the South China Sea with an estimated intensity of 40 kn, reaching a maximum of 55 kn on the 27th while turning northwestward. Lee turned toward the northeast on the 28th and rapidly dissipated.

Mariners Weather Log

"SO WHO SAYS ITS A PACIFIC OCEAN"

Lt. R.G. Ross, USCG
Marine Safety Office, Hampton Roads
Norfolk, Va.

On January 19, 1981 the 21,700-ton CHI STAR, under stern tow by the tug KOYO MARU, arrived at Guam after a 43 day 2,300 mi struggle for survival. The CHI STAR's odyssey started on December 8, 1980 when severe holing was discovered in the bow. At the time, CHI STAR was north of Midway enroute from Los Angeles, Calif. to Sakai, Japan with a load of coal. Also in the area north of Midway was the Mid-Pacific High.

Figure 20.-- The starboard bow of the CHI STAR showing the upper edge of the hole. She was in stern tow by the -ug KOYO MARU and 6-ft down by the bow.

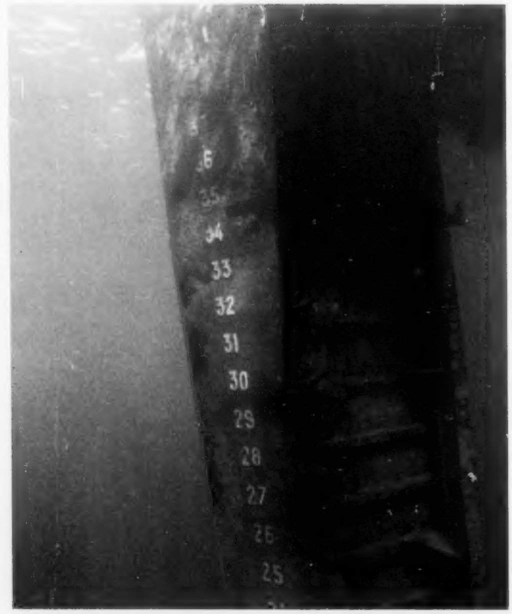

Figure 21.-- The stem viewed from the port side at the upper edge of the hole.

Figure 22.-- The upper chamber of the forepeak tank viewed from theport. Double column chain lockers are visible in the upper-right corner.

Figure 23.-- Looking through the bow from starboard.

When the extent of the damage was realized, the CHI STAR proceeded to Midway and anchored out of the harbor to await assistance. The KOYO MARU arrived from Japan ready to make temporary repairs; however, sea and current conditions precluded making temporary repairs at the outside anchorage. The Navy denied permission to move into a more sheltered inside anchorage and the CHI STAR began its long backward trek to Guam.

Temporary repairs were necessary to enable CHI STAR to safely transit the rough winter weather expected in waters closer to Japan. When Midway was ruled out Guam became the next alternative.

As shown in the photos and sketches (figs. 20 through 24) the CHI STAR suffered serious damage forward of the collision bulkhead. The collision

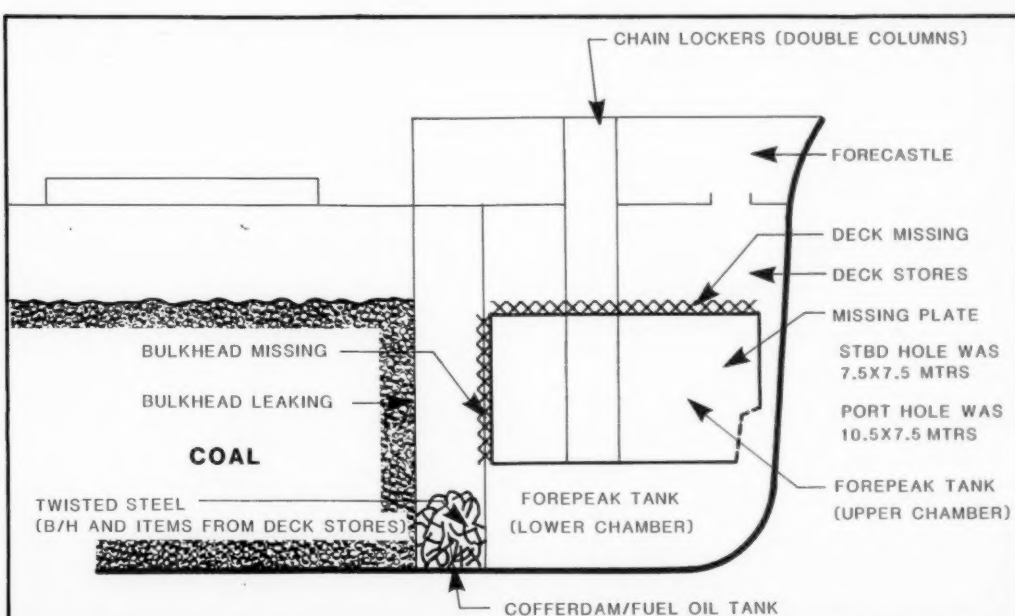

Figure 24.-- Sketch of the bow of the CHI STAR.

bulkhead was known to be leaking. Due to concerns about the vessel's condition and the potential threat to the environment and navigability of Apra Harbor (the only deep water U.S. port in the western Pacific and part of an important Naval Base) LCDR Rich Asaro, Executive Officer of MSO Guam, and I boarded the CHI STAR at sea for a pre-entry survey (Lt. Ross was assigned to the Guam Marine Safety Office at that time.)

We boarded the CHI STAR several miles off the harbor entrance in swells of 6 to 7 ft. After conferring with the Master, the Salvage Master, the Pilot and the American Bureau of Shipping representatives, we went forward to check the damage to the extent possible. The sights and sounds at the bow were indescribable. The first thing we noticed was the definite down slope of the deck. The next thing was the whistling of the cofferdam vents. Stepping into the forecastle we noticed a strong "breeze" at the door -- first in our faces, then at our backs. Moving forward in the forecastle, we found the source of the breeze.

As swells passed beneath the hull water rose and fell in the open forepeak tank. The rising and falling water caused hurricane force winds first out of and then into the deck hatch forward in the forecastle. This wind resulted from swells of only 6 to 7 ft. The forces from the considerably higher seas in the area of the Mid-Pacific High must have been extreme. This action undoubtedly helps to explain how the damage progressed to the final stages shown here. Of course, the initial cause was not known and may well never be known.

The temporary repairs made in Apra Harbor consisted of building an internal steel supporting structure over which plates, fabricated on the KOYO MARU, were welded. The work was performed by surface supplied hard hat divers from the KOYO MARU. The CHI STAR, accompanied by a salvage tug, departed Guam in late February enroute to Japan for permanent repairs.

If there is a moral to this story, I suppose it must be to avoid the Mid-Pacific High in the winter. Two days after the CHI STAR left Guam, the MARCONA TRADER, enroute to Japan with a load of U.S. coal, reported that it suffered two 8x28 ft holes forward of the collision bulkhead while transiting the area of the Mid-Pacific High.

Mariners Weather Log

SHIPBOARD ENVIRONMENTAL DATA ACQUISITION SYSTEM (SEAS)

A REPORT ON DEPLOYMENT AND TESTING

Vince Zegowitz
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Silver Spring, MD

The NOAA ship SURVEYOR (fig.25) put to sea from Kodiak, Alaska during June 1982, and headed for the Bering Sea. Onboard was a candidate unit for the Shipboard Environmental Data Acquisition System (SEAS) being tested by the Marine Services Branch of the National Weather Service (NWS). This unit was designed to collect marine oceanographic and meteorological data and to transmit these data, in their standard BATHY and Ship's Weather Observation formats via satellite, into the appropriate synoptic data bases at the National Meteorological Center (NMC) for operational use. Simplicity, accuracy, and timeliness were obvious points of interest. This concept of a satellite-based system provides a degree of reliability and timeliness far better than the conventional methods of high frequency communications and is intended to substantially augment the existing voluntary observing ship's programs.

This article covers activities leading up to and including the successful testing of this unit during its initial at-sea deployment. Areas of coverage include: (1) preliminary planning; (2) equipment description; (3) shipboard activities and testing; and (4) results. Essentially stated, the planning and preliminary checks were straight forward; the equipment operated extremely well; the testing and actual data transmission from ship to data base was most successful and a number of suggestions for a more improved and efficient future operation were obtained.

PRELIMINARY WORK

Preliminary planning and system checks were carried out during May and the first week of June 1982. The steps necessary to establish a communications path from a shipboard location to the NMC data bases are not necessarily difficult, but can result in some consternation while tracing down meandering leads in pursuit of the desired goal. New terminology had to be acquired. I.D. codes, addresses, data descriptors, time-slots, category numbers, satellite and channel assignments had to be explained, understood, and obtained in their proper sequence.

For this initial at-sea testing of SEAS, the equipment consisted of a GOES Data Collection Platform (DCP), an omnidirectional (GOES compatible) antenna and 50 ft of coaxial cable. The DCP itself was composed of a transmit module, a master control module, an uninterruptible power supply, and a hand held programming terminal. Minimal programming was included enabling entry of channel selection, National Earth Satellite

Figure 25.-- NOAA ship SURVEYOR.

Service (NESS) address identification, and the data itself. Manual entry of the data conformed to the standard ship and bathy formats for ship surface meteorological and XBT observations. What was entered in alpha-numeric characters on the terminal is what came out of the pipe at the other end. The unit was equipped with an 80 character limitation, but is capable of expansion to any reasonable capacity. Transmitter power was 12 watts which, after attaching 50 ft of coax cable between it and the antenna, reduced the actual output power to something over 6 watts. Ground stations at Boulder, Colo., and Wallops Island, Va., provided readouts of the transmitted data and accompanying signal strength indicators.

The equipment was activated and satisfactorily tested at the Gramax Building in Silver Spring, Md. With this preliminary work accomplished there remained to test the system during an operational at-sea deployment.

Accordingly, I departed Washington, D.C., on June 8, carrying the DCP in one hand and the antenna and 50 ft of cable in the other. The conically shaped antenna and the accompanying DCP passed the rigors of baggage handling with a remarkable amount of personal attention since there seemed to be a great deal of similarity between it and a deactivated nuclear warhead.

On June 10, the SURVEYOR arrived on schedule at the Coast Guard Base at Kodiak, Alaska, and I made my way onboard a short step ahead of a serious confrontation with an inflated local economy.

The onboard space, provided for me and the equipment, was more than sufficient for the testing to be performed. The area was located aft of the bridge and directly opposite the radio room on the starboard side. Since the DCP occupies less than one (1) cubic foot of space, size was no problem at all. Also provided was a convenient 110V/AC outlet for power and a through-the-bulkhead fitting to string the antenna cable. The space was located beside the XBT strip chart recorder for convenience in data availability. The XBT deck launcher was located aft on the starboard side of the poop deck.

Setting up the DCP took only the time necessary to unpack the unit, plug in the power cord and screw in the programmable terminal. It was then lashed down to the bench to protect against ship movement. Selection of an appropriate antenna location was of a more critical nature. Since ideal antenna locations are as far removed from large metal masses and radiating power sources as possible, shipboard locations are somewhat restricted. Initially, the antenna was located on the flying bridge level aft of the foremast, but was shifted to the top of the funnel after low DB power levels indicated a shift in location could be beneficial.

On Monday, June 14, the SURVEYOR put to sea, crossed Albatross Bank and proceeded southwestward. On the 16th, the course shifted to the northwest, crossed the Davidson Bank, passed through Unimak Pass and turned northeastward following the north shore of the Alaska Peninsula into the northeastward corner of Bristol Bay and on to Nushagak Bay where we arrived on June 18. The ship remained at this position in support of mammal research being conducted by BLM/OCS, ADF&G and Hubbs Sea-World.

During the transect, four (4) XBT drops were made. While in Nushagak Bay only an additional three (3) drops were made due to the shallow water depth at the anchorage (12-14 m), making a total of 7 XBT drops. Starting at 0600 June 15, through 1800 June 30, forty-four (44) ship's weather observations were taken, prepared, and entered into the SEAS and transmitted over the GOES satellite system.

A typical evolution in reporting an observation was as follows. If the observation was an XBT, then the probe would be launched, data recorded on a strip chart and then digitized, by hand, into the standard XBT format. If meteorological data, the ship's weather observations log sheet would be completed, which is itself the standard format. Now the data was ready to be entered into the DCP. A push button activated the DCP using sufficient lead time (approx. 5 min) prior to the established time slot so that there was no rush to complete the message. Holding the terminal in one hand, the primary steps were entered by typing the characters with the other hand: satellite channel, NESS address and time slot--very simple. Next came entry of the data itself, in exactly the same standard XBT or ship weather format, character for character, space for space. After completing entry, a scroll back capability enabled a check of the data. A one button command placed this data into storage and the transmitter into stand-by. At the designated time (in our case 1 min slots of 0011 and 0029) a push on another button triggered the transmitter and the display printed an "OK" at the end of transmission. All future units will have pre-programmed entry of channel, time, and address information, a stand-by buffer, and a timed transmission capability. Only the entry of the data, through a prompted program with data checks, will be required.

Dual monitoring at both Boulder, Colo. and Wallops Island, Va., was an advantage most platforms don't have. With this in mind, the following statistics resulted:

	Ship Weather Obs.	XBT Obs.
Total Msg's. Sent	44	7
Rec'd. by both Sta.'s Error Free	32	5
Rec'd. by either Sta. Error Free	40	6
Rec'd. by both Sta. With Errors	4	0

The one unaccounted XBT message is exactly that, unaccounted for. Neither station has a record of receiving it, or even a garbled portion of a message. It is possible that it was entered into the unit for transmission but was never manually keyed to the satellite. The test unit had no facility for hard copy generation, as future units will, to aid in record keeping.

Four (4) ship weather messages were received by the Boulder station that contained a very few garbles in the text. There is no record of receipt for these messages at NESS. This is most probably due to the 48 hr message cue NESS maintains for outside interrogation. Non-interrogation during a 48 hr period causes the cue to be deleted of content. The data is still entered into the synoptic data bases and used in forecast generation, but only stays in the interrogatable file for 48 hr. It is also possible that this was the fate of the lone XBT message.

The four garbled messages received exhibited low-power levels (32.8-42.0 DB). Accurate levels of power output to ensure optimum reception have been the subject of debate for some time. Almost maximum geographic distance from the satellite, low angle of acquisition and minimum power source provided a good test of theory. The SURVEYOR provided a perfect platform for this testing. A numerical listing of ship weather messages, power level reception by ground stations and difference between the readings were obtained. An increase of power at the transmitter would certainly be a first step in rectifying garbled transmission.

In addition to signal strength, the frequency error, modulation index and modulation quality were also monitored at NESS. In every instance but one (1) all readings were: zero (0) frequency error and normal modulation index and quality.

An interesting item of note is the apparent lack of consistent correlation between low level DB signals at the ground station and garbled or incomplete messages. Extremely low readings provided error free data as well as the higher signal strengths. This should be grist for the engineers to grind around.

SUGGESTIONS AND ITEMS OF NOTE

- Selection of time slots for ship weather messages should be made as soon as possible after the synoptic hour to ensure inclusion of data in the ship data base used for generating the synoptic analysis.
- The incoming data should be monitored at NMC to ascertain entry into the appropriate data base--or determine why not.
- Transmitter power levels should probably be increased somewhat for long haul operations.
- Antenna siting should receive careful consideration, but be flexible. The vagueries of radiation can make an ideal looking, engineeringly sound position a wash-out. An educated trial and error system is very productive.
- A 10-40 watt transmitter stands little chance when simultaneous keying occurs on a nearby long-wire antenna using 1KW. Foreknowledge of transmission schedules can avoid this problem.
- The equipment itself was totally reliable and performed exactly as specified.
- The use of the SURVEYOR for additional testing would make use of a prime platform.

SUMMARY

- Satellite transmission of data from a sea-going location has arrived at a low cost (approximately $5,000 per unit).
- The SEAS system was successful: ease of operation, minimal installation effort and little intrusion on shiptime or resources was demonstrated. Input into the NMC data bases for synoptic forecasting was accomplished.
- This test further demonstrates that the SEAS concept is practical as an ingredient in the Ocean and Atmospheric Reporting System (OARS) and can play a vital part in providing timely, reliable and accurate data from the world's oceans.
- Manual entry system should be implemented initially due to ease of use and installation, low cost, and excellent return on investment.
- The time is propitious for deployment of a few units on selected vessels to obtain actual data plus provide for more rigorous testing.

Additional information on test results or questions concerning the SEAS program can be obtained by contacting:

Vince Zegowitz
8060 13th Street
OA/W112x1 - Room 1213
Gramax Building
Silver Spring, MD 20910
(301) 427-7278

Hints to the Observer

WIND-CHILL CHART: KNOTS AND KILOMETERS PER HOUR VERSUS DEGREES CELSIUS

WS FORM TA B-0-25
(6-76)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NOAA-NATIONAL WEATHER SERVICE WIND CHILL CHART

EQUIVALENT WIND CHILL TEMPERATURE °C

Wind speeds greater than 70 Km/Sec (35 Knots) have little additional chilling effect.

WIND SPEED *Kilometers Per Hour*														WIND SPEED *Knots*
70	-7	-14	-20	-27	-33	-40	-46	-52	-59	-65	-72	-78	-85	38
60	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-70	-77	-83	32
50	-6	-12	-18	-25	-31	-37	-43	-49	-56	-62	-68	-74	-80	27
40	-5	-11	-17	-23	-29	-35	-41	-47	-53	-59	-65	-71	-77	22
30	-3	-8	-14	-20	-25	-31	-37	-43	-48	-54	-60	-65	-71	16
20	0	-5	-10	-15	-21	-26	-31	-36	-42	-47	-52	-57	-63	11
10	5	0	-4	-8	-13	-17	-22	-26	-31	-35	-40	-44	-49	5
6	8	4	0	-4	-8	-12	-16	-20	-24	-28	-32	-36	-40	3
AIR TEMPERATURE °C	8	4	0	-4	-8	-12	-16	-20	-24	-28	-32	-36	-40	

This chart serves only as a guide to the cooling effect of the wind on bare flesh when a person is first exposed. General body cooling and many other factors affect the risk of freezing injury. The equivalent wind chill temperatures used on this chart are based upon a neutral skin temperature of 33°C. With physical exertion, the body heat production rises, perspiration begins, and heat is removed from the body by vaporization. The body also loses heat through conduction to cold surfaces with which it is in contact and in breathing cold air that results in the loss of heat from the lungs. This chart, therefore, does not take into account all possible losses of body heat. It does, however, give a good measure of the convective cooling that is the major source of body heat loss.

Tips to the Radio Officer

Larry Murphy
National Weather Service, NOAA
Silver Spring, Md.

RADIOFACSIMILE PROGRAM AVAILABLE IN GULF OF MEXICO

On January 1, 1983, a new radiofacsimile service will begin at WLO, Mobile Marine Radio, Inc., Mobile, Alabama. The broadcast will reach all marine interests in the Gulf but is aimed primarily at mariners operating north of 25°N.

Broadcasts are made on the following frequencies:

6850 MHz
9157.5 MHz
11145 MHz.

The radiofacsimile broadcast schedule is as follows:

TIME(GMT)	PRODUCT
0000	SIGNIFICANT WEATHER FEATURES
0300	OFFSHORE MARINE FORECASTS
0315	SURFACE ANALYSIS
0600	SIGNIFICANT WEATHER FEATURES
0900	18 AND 36 HOUR SURFACE PROGNOSIS
0915	SURFACE ANALYSIS
0930	FORECAST AVIATION MARINE
1200	SIGNIFICANT WEATHER FEATURES
1215	SCHEDULE (MONDAY ONLY)
1500	OFFSHORE MARINE FORECASTS
1515	SURFACE ANALYSIS
1630	FORECAST AVIATION MARINE
1800	SIGNIFICANT WEATHER FEATURES
2100	18 AND 36 HOUR SURFACE PROGNOSIS
2115	SURFACE ANALYSIS
2200	SEA SURFACE TEMPERATURE FOR EASTERN GULF (TUESDAY AND SATURDAY)
2200	SEA SURFACE TEMPERATURE FOR WESTERN GULF (THURSDAY AND SUNDAY)
2200	GULF STREAM LOOP CURRENT CHART (MONDAY, WEDNESDAY, AND FRIDAY)

These products are produced by NOAA's Ocean Services Center at the National Weather Service Forecast Office in Slidell, Louisiana.

Marine Observations Program

J.W. Nickerson
National Weather Service, NOAA
Silver Spring, MD 20910

MARINE WEATHER OBSERVATIONS

We need your observations! We turn them into forecasts. Synoptic means something akin to a photograph. At each synoptic hour by plotting all of the ship and land weather reports a forecaster can draw a picture of what the weather is like over the entire area of the map. The detail of this synoptic weather map depends upon the number of weather reports. Only you know the weather at your ship's position. Help us fill the holes on a weather map; at present, we have holes on the weather map big enough to run a hurricane or typhoon through.

INMARSAT

To help expand the ship weather reports received and the area coverage, we are now accepting and paying for weather observations in the eastern Pacific by the International Maritime Satellite (INMARSAT) system. To be more specific it is the area north of the Equator and east of the Date Line(180°) to the coast of North America. All of the observations are important, of course, but more 1200 GMT observations are needed for the morning forecast in the eastern Pacific. Unfortunately, this occurs very early in the morning. If the report cannot be transmitted because the radioman is off-watch, please send the 1200 observation as soon as he resumes his duties.

FEDERAL COMMUNICATIONS COMMISSION (FCC)
Docket No. 79-339

This ruling, in part, exempts cargo ships on domestic voyages along the coasts of the U.S. from carrying radiotelegraph (Morse code). This may have a negative effect on maintaining enough ship weather observations. Plans are in operation to improve the receipt of ship weather observations: INMARSAT, the Nearshore Observations Program, and the "Pride of Baltimore" test.

NEARSHORE OBSERVATIONS PROGRAM

There has always been a shortage of ship observations from the coast to 20 mi offshore. Various other distances to 100 mi have been suggested for the Nearshore Zone. The ships in the Nearshore Observations Program(NOP) will be making observations in the WMO Ship Synoptic Code, FM 13-VII SHIP, just the same as the ships in the Cooperative Ship Program (CSP). The big difference is that the nearshore ships will be using single sideband radio and reporting the numbers of the synoptic code by voice. This is already being done by some ships now.

THE PRIDE OF BALTIMORE

This is a schooner that joined the NOP in September 1982. It will travel rather slowly down the East Coast, through the Caribbean to the Panama Canal. From there it will sail northward to Canada. During this voyage it will be contacting all of the Coast Guard radio stations along the way by single sideband radio to report weather in the synoptic code. The Coast Guard will use the Pride as the subject of a study to determine the number of voice reports that can be handled.

WHY THE SYNOPTIC CODE?

The synoptic code is used by the CSP ships using radiotelegraph and the NOP ships using single sideband radio. The synoptic code, once entered into the communications system, can be handled by computers and distributed throughout the National Weather Service (NWS) and World Meteorological Organization (WMO) systems. At the National Meteorological Center (NMC) the ship observations are used in the computer models which are used by the forecasters. The observations are also used in the development of the climatological base for many of the computer programs.

BONUS BOOKS

The PMO's have books available for participating ships in the CSP and NOP: Marine Weather by Nathaniel Bowditch (updated through 1977), and Weather and Climate of Great Lakes Region by Val L. Eichenlaub, 1979.

These books are to help mariners understand marine weather a bit better. They are not an award book as NWS does not, at this time, have an awards program. We are calling them a bonus book--a way of saying thanks for helping.

The PMO would be pleased to use the occasion to send a picture and an article to your hometown newspaper. These two pictures of crews (figs.26 and 27) participating in the CSP are from the S.S. INGER, Reynolds Metals Company, Corpus Christi, Tex., and the S.S. ALASKAN, Union Carbide Corp., Texas City, Tex.

WHERE THERE'S A WILL, THERE'S A WAY

Figure 26.--Crewmen from the INGER, L. to R. Captain Lawrence Dyer, Master, Charles Kent, Chief Mate, James Lay, Second Mate, William Casto, Radio Officer.

Figure 27.-- Crewmen from the ALASKAN, L to R, Julius Soileau, NWS PMO, Houston,TX, Captain Abbott Gertsen, Master, Peter Horan, Third Mate, Robert Beck, Radio Officer, Louis Schwager, Chief Mate, and the Chief Engineer.

When the barograph (NWS 524-56) clock quit and refused to tick another tick, Second Officers D.J. Milne and R.J. Glossop developed a new system for driving the barograph of the ENNA G (fig. 28). They found a 7-day barograph clock and, as can be seen on the accompanying photo, skillfully adapted it to drive the 4-day NWS barograph. A gear has been removed from the NWS instrument so it is "free-wheeling" and the loop of cord acts as a drive belt. An outstanding bit of engineering and it works!

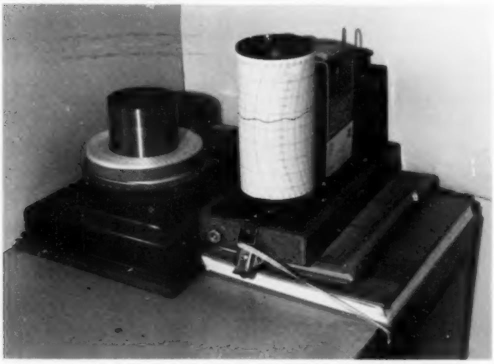


Figure 28.-- The barograph as rigged up on the ENNA G by 2d Officers Glossop and Milne.

SPECIAL SERVICE AWARD

The National Hurricane Center (NHC), Miami, Fla., presented Captain Hal Lane, S.S. PATRIARCH, a Special Service Award. Captain Lane relayed several very crucial observations of hurricane-force winds and over 30-ft seas through his company office to NWS. These observations' delayed the Newport to Bermuda Yacht Race for an unprecedented second day and very likely prevented a yacht race disaster worse than the Fastnet Yacht Race disaster off the British Isles in August 1979.

Jerome W. Nickerson (fig. 29), Marine Observations Program (MOP) Leader, NWS, is presenting a Special Service Award for Dr. Neil Frank, Director, National Hurricane Center, to Captain Hal Lane. The tug PATRIARCH is in the background.

Figure 29.--Marine Observations Program leader Jerome Nickerson presents the award to Captain Hal Lane.

HARBOR PILOTS JOIN NOP

At the American Pilots Association Conference in Charleston, S.C., October 19-22, 1982, J.W. Nickerson, MOP, gave a speech on the need for coastal ship observations as part of the NOP, i.e., in the WMO ship synoptic code. The pilot boats that have no convenient means for radio communications were requested to make and record weather observations in the synoptic code. In general, coastal climatological data is very sparse. These data contribute to the data base for many things: computer models for forecasters, water temperatures for fisheries, general climate for fishermen, beach erosion, coastal engineering, etc.

The response was very good and we welcome the pilots to the NOP.

WE OF NOAA ARE MAKING USE OF THIS SMALL AMOUNT OF SPACE TO EXTEND OUR THANKS TO ALL THE SHIPS' OFFICERS WHO ROUTINELY TAKE SHIPBOARD WEATHER OBSERVATIONS. TO US, THESE EXCELLENT OBSERVATIONS ARE PRICELESS. WE CERTAINLY DO APPRECIATE RECEIVING THEM REGULARLY.

The Editor's Desk

YO-YO DEVICE TESTED SUCCESSFULLY ON NASA BALLOON

What may be the world's biggest yo-yo will help scientists study the earth's atmosphere. The project is part of the NASA Balloon Program managed by the Goddard Space Flight Center's Wallops Facility, Wallops Island, Va.

An instrumented device is borne to high altitudes by balloon, lowered into the atmosphere to make readings and then hoisted up again using energy generated and stored during descent as a yo-yo does.

The reel-down instrument package can be lowered 16 km (10 mi) below the balloon and hoisted up again. A recent NASA test of the device at the National Balloon Facility in Palestine, Tex., was highly successful.

A 26 million cubic foot balloon with the instrument package rose to 40,538 m (133,000 ft). The package was reeled down to 12,192 m (40,000 ft) below the balloon in about 27 min and then reeled back up in about 36 min. The required energy for the reel-back came from 54 kg (120 lb) of storage batteries. The instrument package was released from the balloon on a parachute near Tyler, Tex., where the payload was recovered.

Scientists hope to use this system on long duration balloon flights on which the package will be lowered and hoisted 10 to 12 times, sampling the chemistry of the stratosphere at different altitudes, times of day, and locations.

The primary purpose is to make extensive measurements to help resolve whether the stratospheric ozone layer is seriously threatened by synthetic chemicals, such as the fluorocarbons used as refrigerants and, to a diminishing extent, as spray can propellants.

Project scientist Dr. James G. Anderson, professor of atmospheric chemistry at Harvard University, hopes that flights of 2 or 3 mo can eventually be accomplished. The reel-down system was designed and fabricated by the Harvard group under contract to NASA. Launch and flight operations were conducted by personnel of the Balloon Facility in Texas.

SATELLITES LOCATE SHIPS AND PLANES IN TROUBLE

The Soviet spacecraft, COSPAS 1, launched June 30 is the first satellite in a network to locate aircraft and ships missing or in distress. A four-nation program developed the system. The Russians and Americans are building the satellites, and Canada and France are building ground stations and electronic equipment for the United States satellite. The first American spacecraft is scheduled to be fired in orbit Feb. 15, 1983, with a weather satellite.

The United States and Canada started on the project in 1976 as a means of saving lives and cutting search costs. The satellites can receive the signals from emergency transmitters carried aboard ships and planes. France joined the project in 1977 and the Soviet Union in 1978. The Soviets are to launch two satellites and the United States three. The Soviet satellite is in a test phase and should be operational in January 1983.

During this test phase the satellite located a downed aircraft in British Columbia while over Canada on Sept. 10, 1982. Searchers in aircraft had not been able to locate the Cessna 172 which had crashed in tall trees in rugged high mountains.

The system was designed to locate a craft within 10 to 12 mi and to 3 mi in later equipment. In a test at NASA's Goddard Space Flight Center COSPAS 1 located the transmitter within 2.5 mi. NASA manages the international effort.

WIND SENSOR BEING DEVELOPED FOR MARITIME USE

A propeller-vane type wind sensor is being developed by NDBO for use on buoys and coastal stations. The primary goal of this effort is a low-cost, small, light-weight, rugged, and reliable anemometer/wind vane that is, in addition, easy to manufacture in quantity.

A contract was let to design and fabricate three different prototype units based on NDBO's specifications and general overall concepts. These wind sensors have been delivered to NDBO and are presently under evaluation to identify any modifications which are needed for a follow-on design. It is expected that the correction of the design deficiencies identified by the present series of tests on the three prototypes will yield an operationally qualified wind sensor.

The most important features of the present

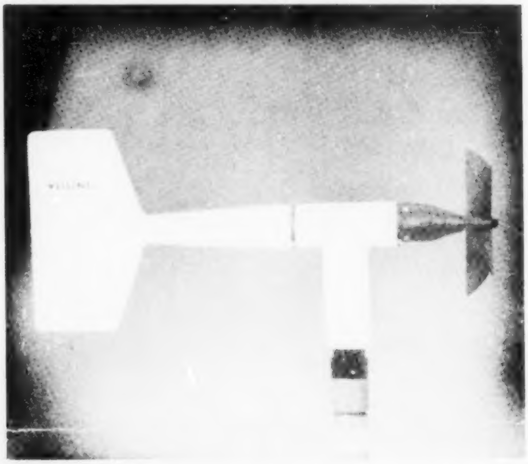


Figure 30.--A photograph of the prototype wind sensor being developed.

designs (fig. 30) are a vacuum molded polyvinylchloride, plastic body with a foam-filled tail section, a polypropylene plastic, four-bladed helicord propeller, a minimum of electronic parts all in a water-tight compartment, no electrical slip rings or brushes, and a quick disconnect electromechanical mounting arrangement for ease of handling at sea. The assembly and disassembly of all the components that make up the sensor are also very simple. A consideration of prime importance during the design and development of the wind sensor has been the use of uncomplicated, fast, and inexpensive manufacturing techniques so that production units will be of low cost.

The design of the operational version of the wind sensor will be very similar to that of the third prototype sensor now under evaluation. This unit has an overall height of 34 cm, an overall length of 54 cm, and a weight of 1.47 kg. The four-bladed helicord propeller has a diameter of 18 cm and a pitch of 30 cm. The rotation rate of the propeller shaft is sensed by a small magnetically operated Hall - effect switch which is located between the pole pieces of a constant reluctance magnetic circuit. A single north-south pole pair permanent magnet of cylindrical shape is fastened to the inboard end of the shaft and produces a magnetic flux which reverses once per revolution of the propeller. The Hall-effect integrated circuit that senses this flux reversal is the sole electronic component in the wind sensor. This circuit can be powered by a voltage source ranging from 6 to 16 VDC and outputs a square wave voltage pulse train of 50% duty cycle. The wind speed output scaling is 3-1/3 hertz per meter per second.

The tail fin causes the entire wind sensor to vane into the wind. This orientation, which is the wind direction, is sensed by a 1000 ohm, 360 degree potentiometer that is mounted on top of the sensor's fixed vertical support shaft.

Wind tunnel calibration and field intercomparison tests on land have been conducted at NDBO with the three prototype propeller-vane wind sensors. Corrections for the design deficiencies identified during this evaluation phase are being incorporated into the operational units that will be produced in 1982 for further testing at sea on NDBO buoys. The expected operational wind speed range of the final sensor design is 0.5 to 80 mps.

From Ocean Engineering Technical Bulletin, NOAA Data Buoy Office, by E. D. Michelena.

VOLCANO DUST WIPES OUT SEA SURFACE TEMPERATURE MEASUREMENTS

A thin cloud of dust from a Mexican volcano prevents satellite measurement of sea-surface temperatures in a wide, globe-girdling band but has not reduced weather forecasting capability, according to NOAA.

Dust from El Chichon extends from 10° to 30°N latitude -- roughly from the Panama Canal to Charleston, S.C., or from Cebu, the Philippines, to Yokohama, Japan, during July.

Sea-surface temperatures are used by meteorologists in weather forecasting, climatology and research. NOAA's National Weather Service explained that sea-surface temperatures are also measured by ships and buoys and there is no evidence thus far of loss of forecast accuracy.

The El Chichon dust cloud, although very thin, has drifted upward into the stratosphere and become chilled by the stratospheric temperature. The NOAA satellite looking down on the earth measures radiation from the sea surface and translates the measurements into temperatures, which are sent back to NOAA land stations. Ordinary water vapor clouds prrevent the satellite from "seeing" the sea surface, and the wispy El Chichon dust, at its high altitude, is now so cold that it also intercepts and contaminates the heat radiation measurements.

NOAA scientists are now working to separate the effects of the El Chichon dust, so that they can both monitor the cloud from El Chichon over the next few years as it gradually disperses, and also devise a correction factor that will enable them again to provide accurate sea surface temperature measurements from the affected latitudes.

HURRICANE-PROBING AIRCRAFT TO SUPPORT STORM PREDICTION RESEARCH

NOAA aircraft will probe Atlantic and Gulf Coast hurricanes this summer to help scientists better understand and predict the direction and velocity of the storms.

The National Hurricane Research Laboratory plans to circle six hurricanes, 2 or 3 days from landfall. The planes will drop sensors to gain information on wind patterns believed to govern the tracks of hurricanes.

The sensors, dropped at 100-mi intervals, will send wind, temperature and humidity data back to the flying laboratories for retransmission via NOAA's GOES East satellite to the National Hurricane Center in Miami.

Knowledge of wind patterns up to about 5 mi above the earth is sketchy. More knowledge could make a major contribution to computer models that would more accurately forecast a hurricane's movement, and likely landfall.

A second investigation is planned to improve forecasts of wind speeds and storm surge when a hurricane does make landfall. The storm surge, which causes nine of every ten hurricane deaths, is a massive wall of wind-driven water, topped by huge waves, which sweeps over the shore when a hurricane strikes.

The NOAA aircraft, flying at stepped altitudes from 200 ft to 5,000 ft above sea level will collect wind, temperature and humidity readings at various distances from the hurricane eye, and will record heat flux within the storm.

Another element of the study will obtain wave height and direction, using a laser altimeter and airborne radar. Findings will be used to develop improved wave and storm surge prediction models.

The planes, among the world's most sophisticated airborne research aircraft, will also fly operational missions from their Miami base as hurricanes approach land.

XERB DWDA STORM DATA

NDBO deployed a special buoy off Cape Hatteras, North Carolina, at 36.3°N, 75.4°W in October 1980, to evaluate the concept of directional wave spectra from buoys. This buoy, commonly called XERB (Experimental Environmental Research Buoy), has a 12-m discus hull. Directional wave data reported from XERB during September 7-11, 1981, illustrated the response of that system to the marine environment.

During the first 2 wk of September, hurricanes Emily and Floyd plowed through the Atlantic east and north of XERB. At 2000 on September 8, hurricane Floyd, tracking northeastward from the Caribbean, was centered near 32.4°N, 63.5°W, or 1,148 km east-southeast of XERB. The same date Emily at 1000 was located near 43.0°N, 51.0°W, or 2,158 km east-northeast of the buoy. These storms were the source of a well-defined and near-steady state swell which dominated the wave spectrum prior to the passing of a cold front. In addition to the two tropical systems, weather maps showed a broad area of high pressure centered over Oklahoma, covering much of the United States, which subsequently pushed a cold front off the Carolinas early on the morning of September 9.

The wind speed records from XERB indicated a gradual frontal passage ranging over several hours from 00-09, during which time the wind direction swung from a southerly direction to the northwest, and the velocity increased from 5 to 12 mps. Shortly thereafter, the heave/directional sensors aboard XERB successfully detected and resolved wave trains originating from the three weather systems.

A polar plot of directional wave spectra (fig. 31), computed for 1200 using the first five Fourier coefficients of angular distribution of energy and the nonweighted partial Fourier sum, indicated a distinctly tri-modal energy distribution. Waves generated by the two tropical systems 16 and 26 hr earlier made up the low frequency end of the spectrum at 1200 and were centered around 0.1 Hz. The spectrum was merged somewhat as a result of the small difference in arrival directions, but spectral resolution was sufficient to identify the two sources. Comparing spectra and bearings reported by XERB to known positions of the storms at 1000 and 2000 on September 8, made it possible to pinpoint Emily and Floyd in the wave spectrum. Emily dominated the long-period component from the east-northeast at 0.09 Hz; Floyd contributed slightly higher frequency swells from the east-southeast at 0.11 Hz. Clearly defined high frequency spectra peaking at 0.18 Hz from the northwest resulted from the wind field associated with the passing frontal system.

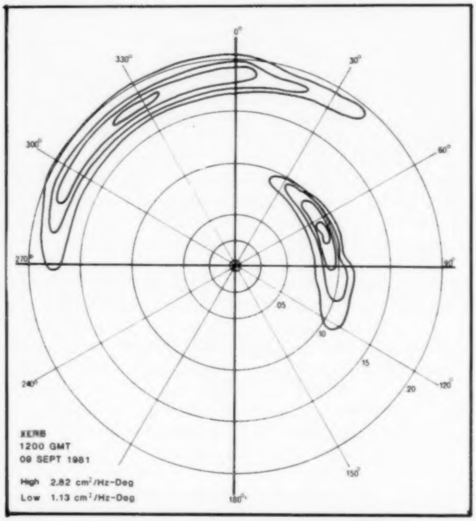


Figure 31.--An example of a directional wave data analysis from the Experimental Environmental Research Bouy (EXRB).

Directional wave data measurements could have a strong impact on marine environmental forecasts and warnings. A forecaster armed with directional wave data is aware of the state of the sea at all times in his area of responsibility. The driving forces contributing to each spectral component can be identified, as well as their respective magnitudes. Directional wave buoys such as XERB, that are moored on the continental shelf, can be used to detect beach eroding swells several hours in advance. Rapidly growing wind-driven sea and crossed-sea conditions critical to mariners are readily observed in directional data which create a new dimension for marine warnings and forecasts.

Extracted from Ocean Engineering Technical Bulletin, NOAA Data Buoy Office, by R. M. Partridge.

THE MARINERS WEATHER LOG WELCOMES ARTICLES AND LETTERS FROM MARINERS RELATING TO METEOROLOGY AND OCEANOGRAPHY, INCLUDING THEIR EFFECTS ON SHIP OPERATIONS.

MARINE WEATHER REVIEW

The Weather Logs combined with the cyclone tracks, U.S. Ocean Buoy climatological data, gale and wave tables, and mean pressure patterns are a definitive report on the weather systems and primary storms which affected the North Atlantic and North Pacific Oceans during this 3-mo period. Hurricane Alley lists and describes tropical cyclones worldwide. Unless stated otherwise, all winds are sustained winds and not gusts; all times are G.M.T.

North Atlantic Weather Log

April, May and June 1982

WEATHER LOG, APRIL 1982--A glance at the monthly mean sea-level pressure chart explains the concentration of the storm tracks along the eastern North American and Greenland coasts. There were a few maverick cyclones south and east of a line approximately connecting Nordkapp and Bermuda. These occurred basically the first and last weeks of the month except off Morocco and over the Mediterranean.

There were two primary paths that joined northeast of Newfoundland and continued through the Denmark Strait. One originated over the Great Plains, crossed the Great Lakes then across Belle Isle; the other originated off the southeast U.S. coast, paralleling it to Cape Race.

There were major differences in the mean sea-level pressure pattern from climatology (fig. 32). The Icelandic Low was split into three centers, a 1007-mb over Anticosti Island, a 1005-mb Angmagssalik, Greenland, and a 1001-mb near 74°N, 15°E. The climatic normal center is 1008-mb east of Kap Farvel. The Azores High was 1022-mb near 32°N, 51°W, about 20° longitude west of its usual position. An anomalous high-pressure center of 1023 mb was near Fastnet Rock.

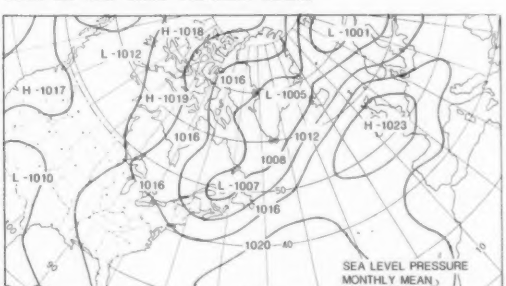


Figure 32.--Mean sea-level pressure, April, 1982.

There were several significant anomaly centers. Perhaps, the most important to ship's weather was the plus 10-mb center slightly west of Ireland with a sub 6-mb center near 43°N, 40°W. There were three negative anomaly centers starting with minus 6 mb near Anticosti Island and two minus 10-mb centers collocated near the respective low centers.

In the upper air at 700 mb there was a trough from Baffin Island to Nova Scotia, then southwestward along the U.S. coast. There was southwest flow over the primary shipping lanes to a ridge along 10°W with a high center near Fastnet Rock. The flow split near 45°N, 35°W with the southern winds moving into a trough off Northwest Africa. Another trough stretched northward from the eastern Mediterranean.

Extratropical Cyclones--The first week of the month the weather pattern over the ocean was made up of many small high and low pressure centers. The second week high pressure moved into the area west of the English Channel, and high pressure dominated most of the ocean except along the north and northwest quadrants. Weak cut-off LOWS formed and dissipated in the vicinity of the Iberian Peninsula.

This LOW formed on the 1st in a trough between two large HIGHS. It drifted more then moved in an easterly direction while taking excursions both north and south. The RUBENS found 45-kn winds west of the center that day. Several ships had gales in the low 40-kn range on the 2d. The ASTONOMER and MATINA were in the vicinity of 40°N, 33°W with winds of 42 kn and they reported 20- to 23-ft sea waves and 25- to 33-ft swell waves, respectively.

By 1200 on the 3d the LOW was only 990 mb but covered a fairly large area off the Bay of Biscay. There were only gales but two British ships reported north and northwesterly swell waves of 25 to 30 ft in the western quadrant. On the 4th another LOW center developed to the north and the whole circulation weakened and the system disappeared on the 5th.

This storm formed over South Dakota on the 2d and deepened rapidly. At 1200 on the 3d it was 965 mb near Green Bay on Lake Michigan. Any early ships on the Lakes would have found at least gale-force winds. By the 4th the southeast quadrant of the storm was off the coast with southerly gales. There was a report of 33 ft swell waves. As the point of occlusion moved near the coast another center formed. On the 5th, the ONDINA (40°N, 69°W) measured 48-kn winds and 30-ft seas. The TEXACO BRAVE found 55 kn near 49°N, 66°W. By the 6th the storm had weakened considerably and had three centers. Only the northern and

original center survived to move northward to Baffin Island.

Monster of the Month--Another storm from the Midwest traveled the Ohio River and crossed the coast at New York. It was joined by another LOW that moved up the coast from the Carolinas. It was 968 mb near Nantucket at 0000 on the 7th (fig. 33). The center of the storm passed very close to the WASHINGTON TRADER at 1630 on the 6th near 39.6°N, 73.6°W with a 979-mb pressure (fig. 34). The winds shifted abruptly from north-northeast at 15 kn to northwest at 40 kn. The Master, E.W. Strohm supplied copies of the observation form and barograph. The ARCTIC TROLL (38°N, 68°W) at 1200 measured 58-kn winds with 18-ft waves and 6 hr later the OGDEN FRASER (37°N, 68°W) measured 60-kn winds with 23-ft waves. The SEA-LAND ADVENTURER was finding 48-kn winds with 25-ft waves near 40°N, 63°W. The OLEANDER (37°N, 69°W) called the winds 52 kn with 33-ft swells.

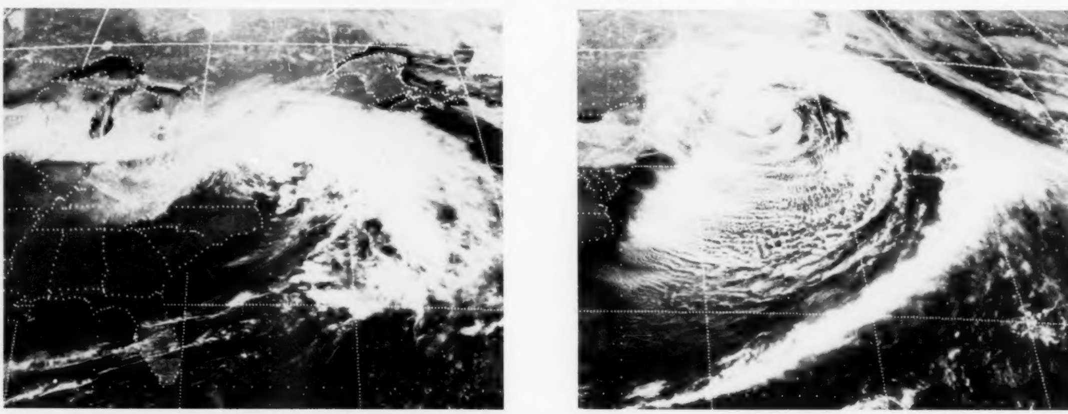


Figure 33.--These two satellite images were taken 24 hr apart, 1700, April 6 (left) and 7 (right). There are indications of both centers on the left image, S.E. Pennsylvania and Nantucket Island. The storm deepened rapidly in the next 5 hr. to 968-mb which was still the pressure at 1700 on the 7th.

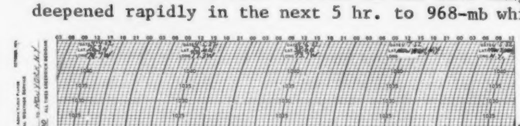


Figure 34.--The barogram of the WASHINGTON TRADER showed she passed very near the center of the storm at the time of the left image above.

At 1200 on the 8th the storm was 977 mb over Prince Edward Island. A drilling rig at 47°N, 49°W measured 78-kn winds. The OGDEN FRASER (36°N, 69°W) measured 55-kn winds. Several ships reported waves over 25 ft and the SEA-LAND GALLOWAY (41°N, 56°W) had 50-kn winds but her real problem was 46-ft swell waves. The storm was rapidly weakening and late on the 9th this center could not be found.

The storm raised havoc along the East Coast from Virginia northward. Thousands were without power in Virginia as the winds gusted to over 60 kn. On Nantucket Island the gusts were up to 72 kn and they were 60 kn at the entrance to Chesapeake Bay. The Northeast had up to 2 ft of snow. The major airports were closed and the cities crippled. The storm was blamed for 21 deaths. It was described as the worst April storm since 1875. An Interstate highway in Massachusetts was closed after 50 vehicles were involved in chain reaction collisions. Personnel on an oil rig off Massachusetts were alerted to evacuate when it reported 40-ft waves.

The South Carolina coast produced this storm on the 9th. It raced northeastward at over 40 kn and deepened to 972 mb by 0000 on the 10th. The NIKKO MARU very near the center (974.5 mb) at 39°N, 64°W had 47-kn winds. Several ships had winds over 50 kn and waves over 25 ft. These included the TFL FREEDOM and RESOLUTE. By 0000 on the 11th, less than 48 hr since the storm first formed it was 964 mb 300 mi north of Trinity Bay (fig. 35). A drilling platform at 47°N, 49°W measured 50 kn winds and 25-ft seas. The JOEKULFELL (53°N, 44°W) measured 60-kn winds. The ANCO EXPRESS (40°N, 54°W) found 33-ft swells. The storm was about 200 mi south of Kap Farvel at 1200 and they had 60-kn winds. The storm moved up the Labrador Sea and was only a trough by the 13th.

This frontal wave formed east of Florida on the 11th. By 24 hr later it was 977-mb near Sable Island. Several ships measured winds over 50 kn. These included the OPALIA (41°N, 58°W) with 63 kn, and the RESOLUTE (39°N, 61°W) with 30-ft waves. The tightly wound storm was 968-mb near St. John's at 0000 on the 13th. A drilling rig near 47°N, 49°W measured 52-kn with 35-ft waves. CHARLIE had 40-kn gales and 25-ft waves on the

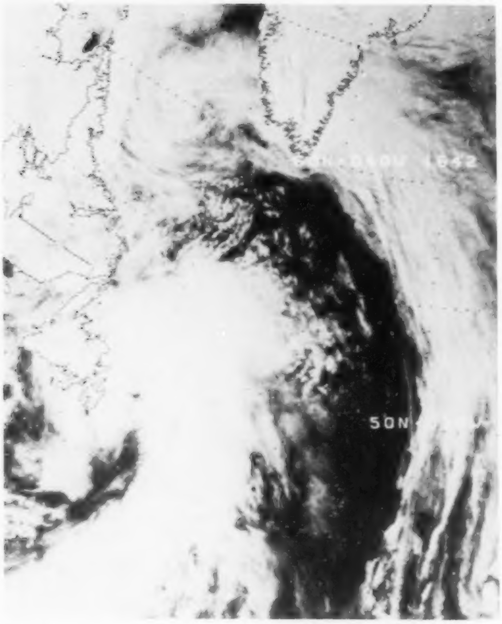


Figure 35.--The storm was east of Trinity Bay at 1640 on the 10th with strong winds and high seas.

14th. This storm took the full primary storm route and entered the Barents Sea on the 16th. The remainder of the month produced relatively good weather for the mariner. Weak storms traveled the primary storm track and there were a few gale reports. The waves were generally below 20 ft. There were some one time high winds and waves reports but no pattern nor concentration.

Casualties--Eight vessels suffered ice damage this month. The trawler CANSO MARINER was holed by ice and sank about 135 mi northeast of Belle Isle. The ARCTIC, JALADÛTA, MONTREAL, JELA TOPIC, NEWFOUNDLAND HAWK, SPACIOUS, TRAKYA 1, and VIOLETTA only suffered damage.

The following ships reported heavy weather damage: BOTEVGARD, ELPIDOFOROS, EMERALD, FAIR SPIRIT, GRACE L., JOSE OLAYA, POINT SUSAN, and SEA-LAND ENDURANCE. The ZEIDA sank in bad weather off Vigo Bay on the 4th. Seven crewmen were killed, 3 were missing, and 8 were rescued.

A new floating 450-ton dry dock broke loose from her moorings at Ontonagon, Mich., on the 3d in 50 mph winds. A construction scow that was landlocked in sand inside Lorain, Ohio harbor was blown free and floated outside the harbor only to ground again west of the harbor during a fierce gale on the 5th.

Other Casualties--The ALVA SEA suffered hull plate damage in heavy weather on the 19th and had temporary repairs at False Bay.

WEATHER LOG, MAY 1982--The extratropical cyclone centers this month were generally weak, short lived, and fewer than normal. The track charts show even fewer as only those cyclones that persisted for more than 36 hr are plotted. There was no primary preferred path. The centers came off or originated off the eastern North American coast from 30°N to 60°N. Only the stronger persisted beyond east of 30°W. Several formed near midocean and traveled eastward. Several others formed in the subtropical ocean north of the West Indies.

The Icelandic Low was 1008 mb, slightly lower than normal and 500 mi northeast of its normal position. There was a weak 1015 mb subcenter south of Sable Island (40°N, 60°W). The Azores High had two 1025-mb centers 3 mb higher than normal. Both were northeast of the normal center and high pressure extended farther into western Europe (fig. 36).

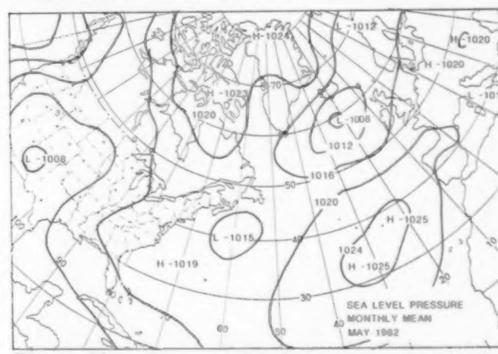


Figure 36.-- Mean sea-level pressure, May 1982.

With the few storms that traveled south of Iceland it was surprising to find a minus 5 mb anomaly center about 500 mi south. This would indicate just generally lower sea-level pressures without the transient storm systems that normally occur. There was also a minus 2-mb center east of Cape Hatteras and south of Newfoundland. The Azores High produced a plus 4-mb center off Portugal. There was also a large positive area with an 8-mb center over Ungava Bay. Europe and the Mediterranean had above normal pressure.

In the upper air there were two long-wave troughs, one off the North American east coast and the other west of the European coast. There was very little ridging between the troughs so the flow was nearly zonal. There was an anomalous low center south of Iceland.

Extratropical Cyclones--During the first week of the month there was a blocking high pressure ridge southward from Greenland to latitude 35°N, and low pressure over the North Sea. High pressure gradually built southeastward and the Azores High was normally located during the second week and the third week moved westward. The LOWS were normally oriented. During the fourth week high pressure built northeastward into Europe. Low pressure areas were generally multicentered.

The first significant storm formed under an upper-air LOW by 0000 on the 2d. LIMA had 40-kn winds just prior to the front. Other ships reported gales and waves up to 20 ft. By 0000 on the 3d the storm was 974-mb near 59°N, 03°W. British, Icelandic, and Japanese ships had winds of 50-kn in the southwest sector with waves as high as 26 ft. The DETTIFOSS estimated 60-kn winds at 1200 near 61°N, 04°W (fig. 37). Gales were still blowing with 20-ft waves on the 4th as another center formed off Nordkapp. The storm broke up into three centers on the 5th and was no longer dangerous.

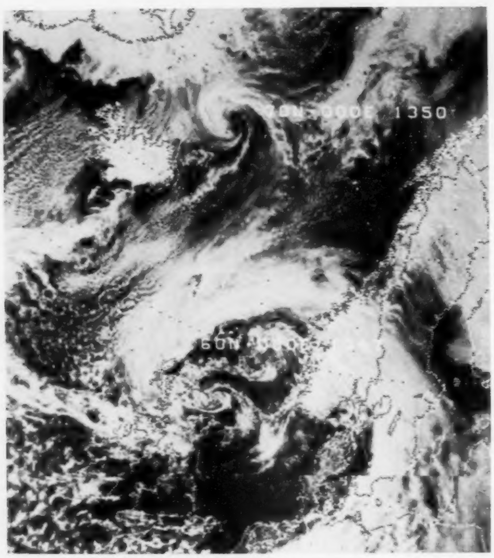


Figure 37.--Although not evident in the analyses swirls in the clouds indicate other centers may have already started to form.

During the first week there was a large area of weak gradient off the southeastern coast of the United States. A front had penetrated as far south as latitude 20°N and waves were traveling along it. A new unstable wave was found near 32°N, 55°W on the 7th. By the 8th it had consolidated the circulation into one 990-mb LOW (fig. 38). Gales were blowing in the western semicircle with 15- to 20-ft waves. They continued as the storm moved northward to Cape Race on the 11th. The LEON PIERRE (41°N, 45°W) measured 47-kn winds and the EXPORT FREEDOM (40°N, 58°W) had 20-ft seas on the 10th. The storm was weakening and turning eastward to dissipate on the 13th.

This LOW formed in a trough off the Brest peninsula on the 10th. Two ships on the east side measured winds near 40 kn. The LOW moved southward on the 11th, and the AMERICAN LEADER (50°N,12°W) measured 35-kn winds. The GULF SHIPPER (49°N, 18°W) found 18-ft seas and 21-ft swells. The storm turned northward again on the 12th. A German

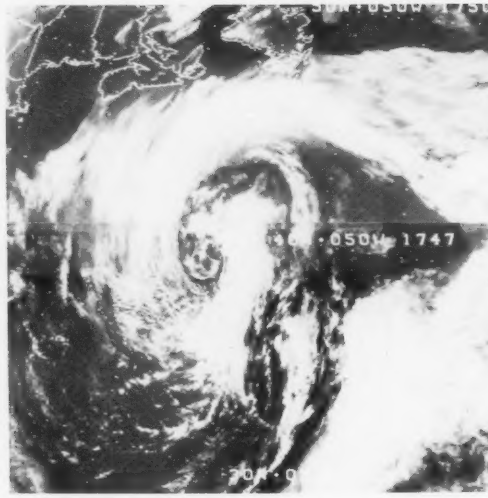


Figure 38.--At 1747 the storm was centered near 38°N, 57°W.

ship near 52°N, 26°W reported 39-ft swells, and the ALINDA (48°N, 19°W) had 26-ft swells. On the 14th it combined with a weak frontal system south of Iceland. The GULF TRADER (53°N, 20°W) measured 40-kn winds and 13-ft waves. On the 15th, 16th, and 17th the 990-mb storm was quasi-stationary in the vicinity of 58°N, 25°W. The weather was quiet. The circulation weakened and all but lost its identity as it traveled northeastward into the Norwegian Sea.

This storm developed out of a multicentered low pressure area off the U.S. East Coast on May 17. On the 18th another LOW moving southeastward over Newfoundland joined the larger circulation (fig. 39). There were a few gales in the southwest quadrant. At 1800 the GULF TRADER (42°N, 52°W) found 48-kn northwesterly winds. Gales continued through the 19th. On the 20th the two centers

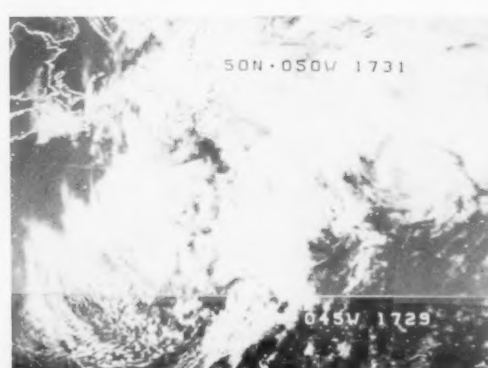


Figure 39.--One center is east of Cape Race and the ther is near 47°N, 40°W.

combined into one 990-mb LOW near 50°N, 38°W. Gales continued in the southwest quadrant and the C.P. AMBASSADOR east of the center had light winds but 23-ft swell waves. On the 21st there was an isolated gale report. The storm started weakening on the 22d and disappeared on the 23d.

The northern plains produced this long-lived LOW on May 16. It moved north of the Great Lakes on the 19th. Southwesterly flow was off the coast on the 20th. The Canadian vessel VCSZ measured 44-kn southwesterly winds near 46°N, 59°W. The winds were mostly gales on the 21st and 22d but the RAVENSCRAIG measured 49-kn winds near 47°N, 40°W, and the AMERICAN LEADER (46°N, 42°W) had 21-ft waves. By 1200 on the 23d the LOW was 984 mb near 56°N, 45°W. The WORLD EDEN measured 50-kn westerly winds 600 mi south of the center. The storm was moving westward on the 24th. The CRESTBANK (50°N, 04°W) measured 47-kn winds and KOSMONAUT GAGARIN (48°N, 39°W) had 23-ft waves. The storm dissipated on the 26th.

This cyclone was an exception to the generally short-lived storms. It originated over Nevada on the 18th and generally wandered across the United States. It was over the Great Lakes on the 23d and moved over Cape Cod on the 25th only as a frontal wave. It strengthened on the 27th as another center out of Quebec joined the circulation. There were a few reports of winds in the 40-kn range; the DART CONTINENT (48°N, 30°W) had 40-kn winds and 20-ft waves. The BAMSA DAN near Kap Farvel measured northeasterly 52-kn winds and 30-ft seas. The KOLN EXPRESS (48°N, 47°W) measured 44-kn westerly winds and 26-ft waves on the 28th (fig. 40).

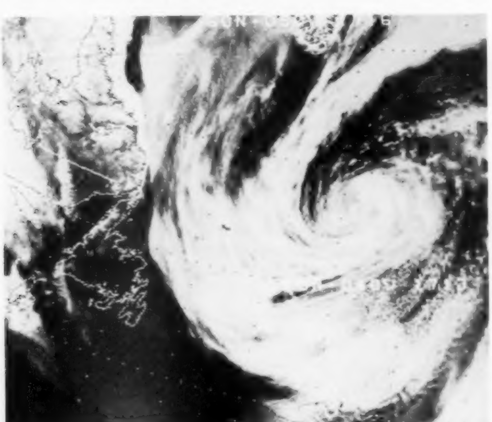


Figure 40.--There is little doubt where the upper-air center of this storm is at this time.

At 1200 on the 29th the storm was 978 mb near 55°N, 30°W. At 0600 CHARLIE had measured 39-kn winds from the northwest and 23-ft waves. There were gales in the high 30-kn category and two Icelandic ships near 66°N, 26°W had 44 kn. CHARLIE still had 20-ft waves on the 30th. The storm broke down rapidly late on the 30th and moved over the Greenland Sea.

Casualties--Fog was the single factor this month that was involved in many of the weather casualties. The ERNEST R. BREECH went aground in fog in the St. Clair River. The fishing vessel TOMMY P. capsized in a collision with an unknown freighter in dense fog off Ocean City, Md. Five crewmen were rescued. The skipper was missing. Other collisions in fog were: KRETINGA and INOWROCLAW, BARBARA B. FLETCHER and MARITIME ALLIANCE, LA PAMPA and TARNOFORS, and STEADFAST and SAFE TRUCK.

The following vessels reported heavy weather damage: BAHMA, BIAKH, BRITTA ODEN, CAPO GALLO, DILA, and GERALD G.

The ARETI L. damaged her propeller in ice on Lake Superior in early May.

WEATHER LOG, JUNE 1982--The cyclone tracks and mean sea-level pressure for June were significantly different from climatology. According to climatology the primary track of cyclones affecting the marine environment originates along the New England coast, and traces a path northeastward to the Faeroe Islands with a branch through the Denmark Strait. This month most of the maritime storms originated near the east coast of the United States between Cape Hatteras and Maine. Their early paths were easterly to east-northeasterly and dispersed between latitudes 35°N to 50°N. Some of the southern storms curved northeasterly near longitude 30°W with a concentration of paths within a 10 degree area centered on 50°N, 25°W. The mean Icelandic Low was on the edge of this area. Three storms continued to track northward towards Iceland and several continued into the United Kingdom. There were many storms over Canada but they generally remained within the continental boundaries.

The Icelandic Low at 1005 mb was 4 mb deeper than normal and at 51°N, 21°W about 700 mi southeast of its normal position. There was an anomalous Low over northern James Bay and a High off Trinity Bay. The Azores High was 1025 mb near 29°N, 32°W and near normal except for a 1024 subcenter near 28°N, 43°W. The normal high pressure over Greenland and northern Canada was 1022 mb, 7 mb higher than normal (fig. 41).

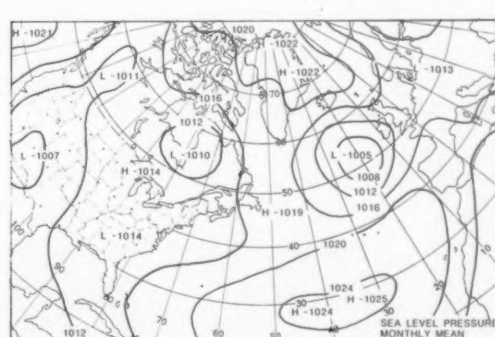


Figure 41.--Mean sea-level pressure, June 1982.

The anomaly centers that indicated the greatest departure of the marine weather from normal was a minus 11 mb center associated with the Icelandic Low at 49°N, 20°W and two plus 9 mb centers, one over Baffin Bay and the other north of Iceland. Associated with those positive centers was an inverted ridge extending southward along 50°W to about 43°N.

The upper-air flow at 700 mb was zonal, nearly directly west to east, between latitudes 35°N and 50°N between the two continents. An anomalous Low was centered near 53°N, 25°W in association with the surface Low.

Hurricane Alberto occurred this month.

Extratropical Cyclones--The high-pressure areas were the major factors controlling the marine weather this month. High pressure over the sub-Arctic kept the cyclones farther south than normal and generally weak. The first week of the month the pattern was near normal with LOWs west through north of the Azores High. During the second week the Arctic High built southward and the Azores High northeastward with only weak frontal waves between them. In the third week the Arctic High retreated and weakened but high pressure remained in the vicinity of Iceland. The LOWs were more intense. The fourth week the Arctic High was weaker but remained over the northern seas. At the end of the month the pattern approached normal.

This frontal wave was east of New York and south of Cape Race on the 1st. It traveled east-northeastward and at 1800 on the 2d the EXPORT CHALLENGER (39°N, 35°W) had 40-kn winds near the front. The storm intensified on the 3d and the RAVENSCRAIG (49°N, 18°W) had southerly 44-kn winds. ROMEO had 20-ft seas. At 1200 on the 4th the storm was 985 mb near 50°N, 23°W. There were gale reports in three quadrants of the storm with wave reports of 20 ft. The storm was quasi-stationary through 0000 of the 6th. There were a few near gale reports and one report of 20-ft seas in the southern quadrant. Late on the 6th another LOW moved into the circulation and became the primary cyclone.

The next significant storm of the month developed off Cape Hatteras on June 8. By 0000 of the 9th the DART CONTINENT (42°N, 65°W) had found 43-kn northeasterly winds with 20-ft swells. By 1200 she was reporting 34-ft swell waves. The storm was drifting eastward at about 8 kn. The SEA-LAND LEADER near 41°N, 60°W radioed 44-kn easterly winds and 16-ft waves on the 10th. The PENMAN (38°N, 48°W) measured only 14-kn winds but found 37-ft swells. The cyclone continued to drift eastward with generally light winds. On the 14th the EDWARD RUTLEDGE had 35-kn gales. The OGDEN FRASER measured 40 kn on the 15th. By 1200 on the 17th the storm was gone.

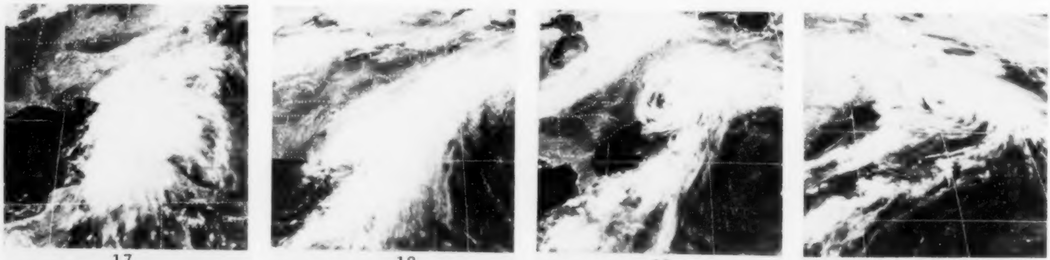
This LOW formed over the Gulf of Mexico on the 17th. It was near Charleston, S.C., by 0000 on the 19th. At that time the COLUMBUS QUEENSLAND had 52-kn winds and 33-ft seas off Jacksonville, Fla. and the PRINCE RUPERT CITY off Savannah, Ga., had 46-kn winds with 23-ft seas.

As the storm moved up the east coast it drenched the coastal areas with up to 4 in of rain in many areas and nearly 8 in at St. Augustine, Fla. Coastal stations recorded winds gusting up to 60 mph which was recorded at Diamond Shoals Light. High tides produced beach erosion. Air reconnaissance on the 19th indicated highest winds of 60 kn with stronger gusts east of the center and a central pressure of 994 mb. The storm was suspected of being tropical rather than extratropical as there was no frontal system involved until the 20th when it absorbed one moving southeastward across the United States (fig. 42).

By 1200 on the 20th the 984-mb storm had raced to Sable Island. Along the way many ships had 35- to 50-kn winds with waves up to 31 ft as reported by the BOSTON near 37°N, 73°W. The SEA-LAND PACER (42°N, 59°W) measured 50-kn winds as did the EAGLE ARROW (40°N, 60°W). An American ship measured 50-kn easterly winds on the 21st, others had winds in the 40-kn range.

By 1200 on the 22d the storm was 988 mb near 51°N, 37°W. Most of the winds were in the gale category, but CYGNUS (48°N, 38°W) found 51-kn winds, 23-ft seas, and 28-ft swells. The next day she had 36-kn winds, 16-ft seas, and 25-ft swells. The storm was weakening on the 24th and developed two centers. The storm was gone on the 25th.

This cyclone was analyzed near Quebec on the 26th. It traveled eastward as a weak wave until the 29th. On the 30th the CIROLANA (50°N, 20°W) had 40-kn winds. The TFL DEMOCRACY (51°N, 24°W)



17 18 19 20

Figure 42.--Chronical of a storm. These 1700 NOAA SMS images from the 17th through the 20th shows the development of the storm as it moved up the coast.

measured 40-kn winds, 18-ft seas, and 23-ft swells. The GEORGE OUSHAKOV had 20-ft seas. At 1200 the LOW was 992 mb near 55°N, 20°W. On July 1 the storm was moving northeastward and was of no consequence.

A series of frontal waves was moving along a front south of the Great Lakes on the 29th. One of these survived to become this storm. By 1200 on the 30th it had consolidated a large circulation around a 994-mb center near 47°N, 66°W. A ship that appeared to be the SEA-LAND PACER (42°N, 54°W) north of the warm front had 25-ft swells.

On July 1 the 985 mb LOW was near 55°N, 65°W. The WVFN (47°N, 49°W) had 39-kn winds from the south. The PERRYVILLE at 37°N, 57°W found 20-ft swell waves on the 2d. The storm was now moving northeastward and over the Labrador Sea. It dissipated near Kap Farvel on the 3d.

Casualties--The CANADIAN BULKER hit an iceberg on June 16 near 47.5°N, 49.3°W and suffered a large gash in her bow. The tug/supply vessel LISBETH TIDE sank south of Malta. The TOURAINE rescued one of 10 crewmen. The CAEDMON and NORMAN COMMODORE collided in fog at Portsmouth. The TULSIDAS struck a quay wall during a squall at Madras on the 9th. The OSWEGO GUARDIAN alleged heavy weather damage on arrival at Marseilles.

The WORLD PETROBRAS broke berthing ropes and suffered other damage in heavy winds at Sao Sebastiao, Brazil. The ESSI SILJE was shearing heavily while under tow in force 7 to 8 winds northwest of Cape Finisterre.

North Pacific Weather Log

April, May and June 1982

WEATHER LOG, APRIL 1982--Without an accurate count there appeared to be fewer significant cyclones than normal this month. Those that occurred were not especially severe but the mean Aleutian Low was deeper than normal indicating the LOWs in that area had lower central pressures. There were two primary storm tracks; one from Hokkaido northeastward into the north-central Bering Sea, the other was from the vicinity of 25°N, 140°E northeastward into the Gulf of Alaska. The two straddled the climatological track. There were several anomalous cyclones between Hawaii and California.

The mean sea-level pressure differed significantly from climatology (fig. 43). The primary Aleutian Low was 1005 mb near 58°N, 148°W, southeast of Kodiak. There was another 1012-mb center southeast of Mys Olyutorskiy. Climatology had 4 centers of about 1009 mb across 55°N latitude. The Pacific High was 1027 mb near 37°N, 159°W, 4 mb higher than normal and west-northwest of its normal position.

The ocean north of latitude 30°N generally had higher than normal pressures except for a small minus 5-mb center south of Valdez. A plus 8-mb center near 48°N, 180° and a plus 7-mb center over the Sea of Okhotsk formed a large positive anomaly area.

The upper-air flow was primarily zonal with long-wave troughs off the Asian and North American coasts. There was a short wave trough east of Hawaii.

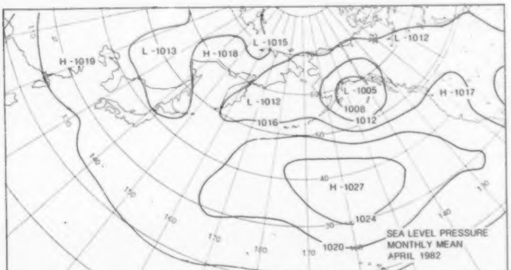


Figure 43.--Mean sea-level pressure, April, 1982.

Extratropical Cyclones--The stronger cyclones were during the first half of the month as the weather moderated from the winter. The first week was primarily dominated by low pressure systems but during the last part high pressure built eastward from the Asian continent and the Pacific High built northwestward. By the 9th and 10th there was a large 1050-mb HIGH centered near 45°N, 175°W. There were several cut-off LOWS south and southeast of the HIGH during this time. The HIGH retreated southeastward with lowering pressure and a large quasi-stationary LOW dominated the Gulf of Alaska. The third and fourth weeks the pressure centers were more nearly normally oriented.

This storm came out of China on the 2d. There were a few gales reported on the 3d as it moved over the Oyashio Current. At 0000 on the 4th the storm was 971 mb east of Ostrow Urup and paralleling the island chain. A Soviet ship reported 47-kn winds northwest of the Island and another nearby had 20-ft seas. The NEW WESTMINSTER CITY, about 300 mi south of the center, reported 30-ft swells. At 0600 the PRESIDENT WILSON (49°N, 156°E) found 42-kn northeasterly winds and 23-ft easterly swell waves. The TOYOTA MARU NO. 11 had 25-ft waves pounding her starboard side on the 5th and the AQUAGRACE (51°N, 164°E) contended with 53-kn northwest winds and 20-ft seas. At 1200 the LOW was 960 mb near 59°N, 174°E. The PASY reported 45-kn winds. By the 6th the PRESIDENT WILSON was near 42°N, 146°E with gales and 30-ft westerly swells. A SHIP far to the north (59°N, 176°W) had 38-kn winds and 25-ft swells. By the 7th the storm had broken up into three different centers as the original LOW moved over the Chukchi Sea. The FUKUKAWA MARU (45°N, 178°E) had winds over 50 kn and another ship had 20-ft seas as they passed through a trough line. Later

in the day all indications of the original storm were gone.

It was at this time that the large 1050-mb high-pressure area was building to a climax. A high-pressure cell that moved off the Asian coast on the 4th had moved eastward along latitude 35°N and then northeastward on the 7th when it started building. A cell of the Pacific High had drifted northward, then westward, gradually increasing in pressure. On the 9th they combined into one 1050-mb center near 46°N, 175°W. Very few Highs build stronger than this over water (fig. 44). It was surrounded by five low-pressure centers of varying strength. The HIGH started slowly weakening late on the 10th and on the 13th moved southeastward toward its normal location. There were quite a few high swell wave reports south and north of the center. The highest was 49 ft by the PRESIDENT FILLMORE near 52°N, 174°E.

This was one of the LOWs surrounding the probably near record HIGH. It formed as a frontal wave north of Kyoto on the 8th. The PRESIDENT WILSON was caught in the southern edge of this storm with 40-kn winds on the 9th as was the SEA-LAND DEFENDER (50 kn) and SEA-LAND DEVELOPER also 50 kn.

The storm was 994 mb on the east coast of Honshu at 0000 of the 10th. The WESER EXPRESS had 50-kn winds with 23-ft waves south of the center. The storm moved northward over the Sea of Okhotsk late on the 10th and rapidly disintegrated.

A frontal wave came out of the East China Sea on the 5th and traveled south and east of Japan. On the 8th a second LOW formed at the point of occlusion and the first center disappeared. The large 1044-mb HIGH was about 1,000 mi to the east. The PACIFIC VENTURE east of the LOW measured 52-kn southerly winds with 15-ft waves. The LOW was racing along the west side of the HIGH. The MING GLORY (39°N, 163°E) measured only 25-kn winds but had 33-ft waves. The SHINANO MARU (48°N, 166°E) had 38-kn winds and 25-ft waves. The 1004-mb LOW moved over the top of the 1050-mb HIGH on the 10th. The PRESIDENT FILLMORE (52°N, 175°E) estimated 45-kn winds, 20-ft seas, and 49-ft swells.

The LOW moved over Kodiak Island on the 11th. The CHIHIRO SAN MARU near 54°N, 156°W measured 51-kn winds with 20-ft waves while CHEVRON COLORADO (56°N, 143°W) measured light 21-kn winds with 54-ft swell waves. By the 12th the LOW had deepened to 968 mb near 56°N, 145°W. Ships were measuring winds up to 50 kn and waves up to 39 ft. At 1200 buoy 46003 measured 25-ft waves.

On the 13th and 14th there was a band of high

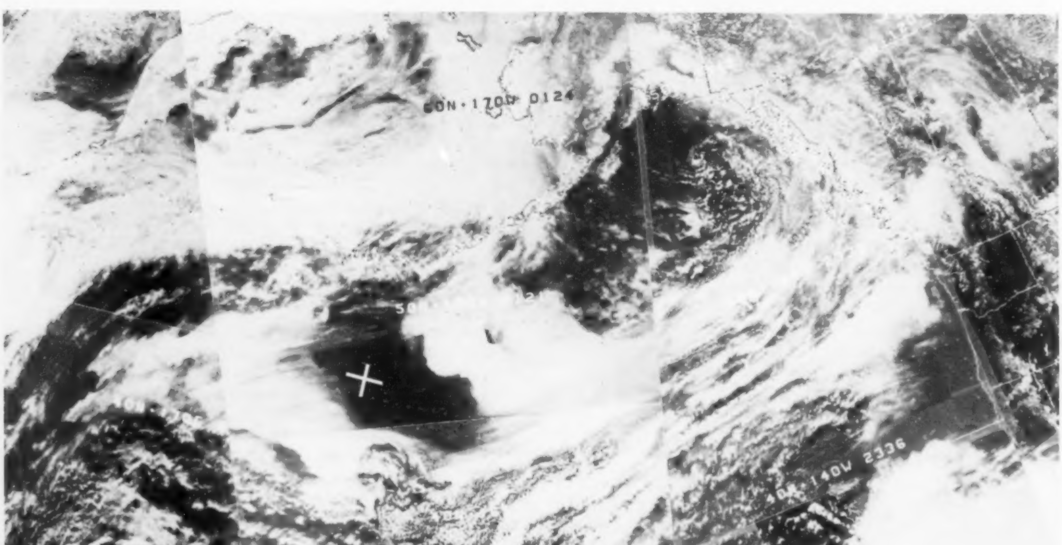


Figure 44.--This mosaic of four NOAA Polar-orbiting satellite orbits shows the 1050-mb HIGH and the associated clouds and weather systems at about 0000 on the 10th. The white + near 46°N, 175°W, marks the center.

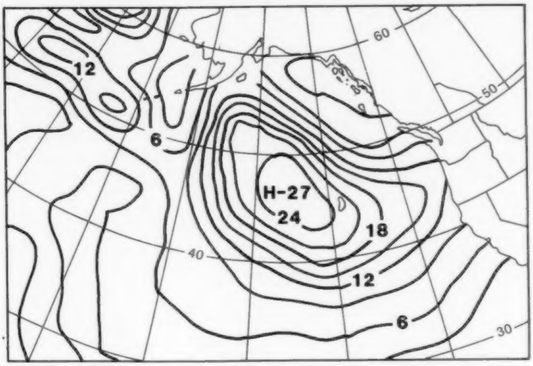


Figure 45.--The sea wave analysis for 0000 on the 10th.

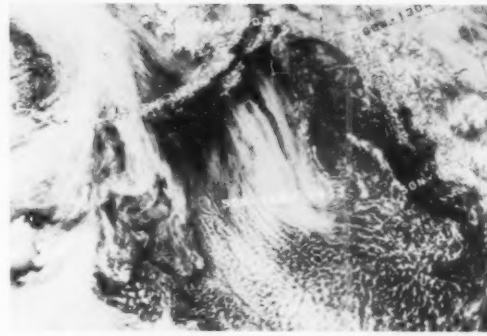


Figure 46.--Satellite image for 0000 on the 10th.

waves extending from about 500 mi west to 700 mi south of the center (figs. 45 and 46). The highest report available at this time was 36 ft by the BALDBUTTE (35°N, 121°W). Later on the 14th the next storm was moving eastward across the Bering Sea and this one quickly disintegrated.

As happens many times when a cyclone approaches or travels along a mountainous peninsula a second center will form on the other side. This was the case here. As a previously described storm decayed over the Sea of Okhotsk this LOW formed east of Kamchatka on the 12th. It moved slowly eastward and was 991 mb on the 14th north of Unalaska Island. A SHIP near 60°N, 178°W reported 50-kn, east-northeast winds with 25-ft waves. With the westerly to northwesterly fetch continuing, several ships reported light winds with high swell waves of 25 to 35 ft. On the 16th this storm was 982 mb near Kodiak Island (fig. 47). The reported winds picked up speed later in the day with 60 kn by the GREAT LAND and 50

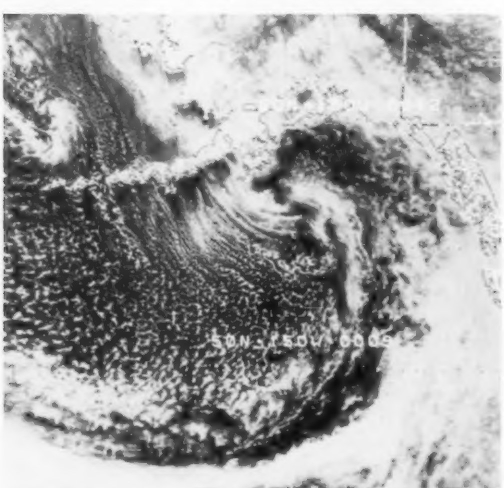


Figure 47.--The satellite easily verifies the posi- of the storm.

kn by the ALEUTIAN DEVELOPER. On the 17th winds of 50 kn were measured and seas of 30 ft. On the 18th the storm was gone.

An inverted trough south of high pressure bore this storm on the 14th. It remained nearly stationary the first 24 hr as high pressure impeded its movement. For the next few days it was in an area of few reports but the storm was not particularly strong. It broke from between HIGHS on the 18th and picked up strength with a few gale reports. On the 19th the ATLANTIC PIONEER (54°N, 143°W) reported 64-kn winds with no verifying waves. Other ships reported winds in the 50-kn category with waves up to 23 ft. The LOW was 974 mb near 53°N, 150°W at 0000 of the 20th. The PRESIDENT ADAMS (51°N, 155°W) had 60 kn out of the north with 33-ft swells. Other ships were measuring winds from 40 to 60 kn with waves up to 33 ft. The LOW started weakening on the 21st but two ships reported measuring winds over 70 kn, the ATLANTIC PIONEER and a Soviet ship. The storm was gone on the 22d.

This storm formed over the southern tip of Kyushu late on the 20th. There were gale reports on the 22d. The SAMARIA (36°N, 148°E) reported 50-kn winds, 30-ft seas, and 21-ft swells on the 23d. Two ships reported 70-kn winds; the DAIEI MARU (42°N, 146°E) and the SURUGA MARU (44°N, 162°E) neither reported waves, but the PRESIDENT TYLER (38°N, 147°E) measured 40-kn winds with 33-ft swells. The storm was 990 mb near 42°N, 166°E at 0000 of the 24th. The winds were gales but there was a 23-ft swell report in the southwest quadrant. The storm moved into the Gulf of Alaska on the 26th. Late in the day and on the 27th there were 40-kn winds. The GALVESTON (55°N, 138°W) reported 45 kn with 25-ft swells. A U.S. ship, the NJDG, had 50-kn winds and 39-ft swells from the east near 59°N, 145°W. The LOW moved over the Kenai Peninsula on the 28th and weakened rapidly.

This frontal wave was first analyzed near Iwo Jima on the 28th. It raced east-northeastward and on May 1 was 990 mb near 41°N, 178°E. The winds had increased to the 40-kn category and wave reports up to 30 ft. The HARUNA MARU (42°N,

176°E) measured 52-kn winds with 26-ft waves. On the 2d there were several 20-ft wave reports in the western quadrant. The storm weakened as it moved over the Gulf of Alaska and finally disappeared on the 6th.

Casualties--The Coast Guard searched for two sailboats and four sailors between San Francisco and the Farallon Islands that were missing during a race on the 10th. A storm with 60-kn winds disrupted the race with 127 boats. Three other boats ran aground and another capsized. Two persons in another boat were killed. Seven inches of rain caused mudslides and flooding over the weekend.

These ships reported heavy weather damage but it could not be positively determined which weather system was involved: ANCO ENDEAVOUR, DORA, DRESDEN, EASTERN FRIENDSHIP, KINKO MARU, PRINCE RUPERT CITY, SEA-LAND ENDURANCE, STRATEGIST, and SUNSHINE ISLAND.

Other Casualties--A ferry sank near Rangoon with 93 of 211 dying. The DAIFALLAH and PETROSTAR II collided in a severe storm at Jeddah on the 26th. The SOLIDARITY and WILLIAM HOOPER contacted in the same storm. The ACT 4 lost containers overboard enroute to New Zealand.

WEATHER LOG, MAY 1982--The tracks of the centers of this month's cyclones were fairly evenly spread between about latitudes 35°N and 60°N. They were primarily easterly until about longitude 170°W where they turned northeastward. There was no obvious preferred track.

The Aleutian Low was 1008 mb near 55°N, 175°W. There was a small 1012-mb LOW center near the tip of Kamchatka. This matched climatology fairly well except it shows a third center near Unimak Island (fig. 48). The Pacific High at 1028 mb was 5 mb higher than its climatic counterpart and about 300 mi to the northeast at 38°N, 141°W. There was a 1022-mb subcenter near 31°N, 175°E.

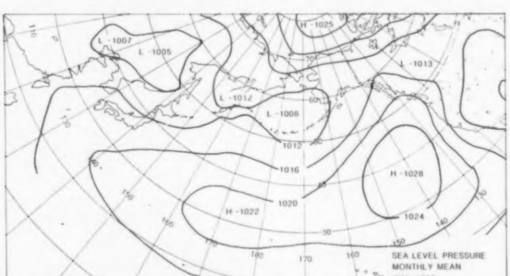


Figure 48.--Mean sea-level pressure, May, 1982

The most significant center on the anomaly analysis was plus 7 mb near 45°N, 140°W. This area constituted a large block off the North American coast. Most of the ocean area north of latitude 20°N was slightly positive. An exception was a slightly negative area (-1 mb) that stretched from the northern Bering Sea to latitude 35°N between longitudes 165°W and 180°.

The circulation center in the upper air at 700 mb was over the central Bering Sea, slightly lower than normal. There were two high centers, one on each side of the Date Line, that were higher than normal. This tighter gradient produced higher windspeeds. The two long-wave troughs were inside the Asian coast and along 175°W. The normal ridging off the North American coast was more accented than usual.

Typhoon Pat occurred in the western ocean and tropical storm Aletta in the eastern ocean.

Extratropical Cyclones--The location and strength of the high pressure centers were a primary controlling factor in the marine weather this month. The first week there were Highs both east and west of the Date Line. The Lows were multicentered and held to the north and west. The second week the Highs broke down and the Lows penetrated southward with many pressure centers. The pressure centers consolidated the third week with a frontal wave pattern between the Pacific High and the Siberian High. The fourth week the Highs built again, especially the Pacific High and the Lows were again forced northward.

As indicated above, the first 2 weeks were very quiet. The cyclones were weak and disorganized. There were a few reports of gales but they were isolated with no pattern.

A LOW moved out of Asia during the second week of the month. As the occlusion moved over the Sea of Okhotsk another LOW formed at the point on the 11th and the other dissipated. Late on the 12th gales were being reported by the Soviet fishing fleet. By 0000 on the 13th the TOYOTA MARU No. 15 found 48-kn southerly winds near 46°N, 166°E. The OCEAN BRAVE (46°N, 155°E) southwest of the center had 45 kn from the northwest and 26-ft swell waves. Two American ships had gales. At 0000 on the 14th it was 980 mb near 50°N, 165°E. A frontal wave was approaching from the southwest and by the 15th it was gone.

This was the frontal wave mentioned above. It originated over the Sea of Japan on the 13th. The MARSHAL MALINOVSKIY, west of the Tsugaru Strait, reported 41-kn winds at 0000 on the 14th. On the 15th this storm absorbed the circulation of the previous storm and strengthened. There were some gale reports and at 1200 the JAPAN ACACIA (50°N, 173°E) had 52-kn west winds about 100 mi south of the 976-mb center. The waves were 25 ft.

There were quite a few gales on the 0000 collective of the 16th (fig. 49). The KEN SUCCESS (50°N, 162°E) had 30 kn. The PRESIDENT ADAMS had 25-ft swells southwest of the center and the SEA HAWK had 26-ft waves in the southwest quadrant. There were gales on the 17th with waves up to 20 ft. The storm was 975 mb over the Bering Sea. The storm crossed the Aleutians into the Gulf of Alaska on the 18th slowly weakening. It dissipated over Alaska on the 21st.

This was a long-lived little storm with only a few hours of notoriety as it dashed against the Rocky Mountains. It formed at the point of occlusion of an Asian front several hundred miles

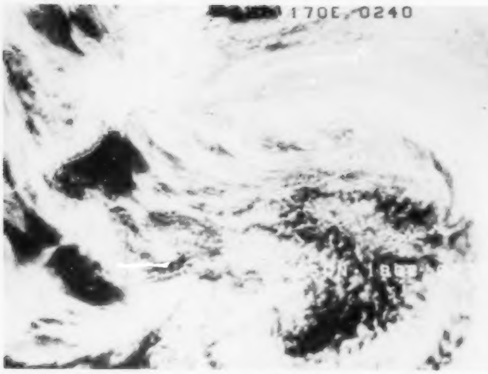


Figure 49.--The strong winds are not under the stratus clouds to the north, but with the cumulus in the southern semicircle.

east of Tokyo on the 8th. It drifted eastward between latitudes 35° and 40°N until the 13th. At times it took imagination and one ship report to find it. At this time, its circulation became alined with a deepening Siberian upper-air LOW and raced northeastward. The first gales were reported on the 15th. At 1200 on the 16th the 990-mb storm was west of Vancouver Island. The OVERSEAS JUNEAU had 40 kn with 18-ft seas. There were a few gales early on the 17th. It barely managed to survive crossing the mountains where it turned northward and crossed into the Beaufort Sea on the 20th.

This was another of those long-lived storms that had only a brief flare. This one started south of Kyoto on the 15th. The first gales on the chart were on the 21st. At 0000 on the 23d the 982-mb storm was near 50°N, 155°W. Ships in the southerly flow were finding gales. The TOYOTA MARU No. 11 found 41-kn winds from the northeast, north of the center. Later in the day the PORTLAND also had northeasterly 40-kn winds south of Seward. There were a few reports on the 24th and 25th with a 20-ft wave report off Sitka. The LOW disappeared on the 25th.

Yet another fairly long-lived LOW. It originated over the south tip of Kyushu on the 19th and developed a well-formed but weak circulation early. The center moved along the east coast of Japan and the Kurile Islands until the 23d when a new center formed to the east and started on an easterly path. By the 25th the 984-mb LOW (fig. 50) was near 48°N, 176°W and gales were blowing with some waves up to 20 ft. The winds continued to increase and the EASTERN VENTURE (48°N, 176°W) measured 50 kn with 30-ft seas. The MING ADVANCE (43°N, 163°W) had 48 kn. On the 26th the SEA-LAND ENDURANCE (45°N, 172°W) measured 48-kn winds with 21-ft waves. The ASIA MARU was 750 mi south of the center with 36-ft swell waves.

The storm abruptly turned northward on the 27th. The GREEN AUKLET (53°N, 175°W) measured 38-kn winds and 25-ft waves. Nearby the EASTERN HIGHWAY measured 48 kn. The storm weakened

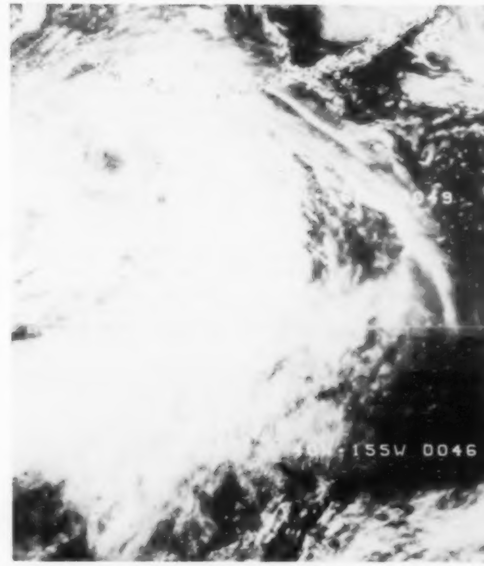


Figure 50.--The appearance of each storm is different due to the many variables involved.

rapidly on the 28th over the Bering Sea.

At various times during the course of the month the Pacific High crowded close to the California coast and the trough from the semi-permanent LOW over the Gulf of California intensified. This produced strong northwest winds along the California coast.

These situations occurred to some degree during the following times: the 4th and 5th when

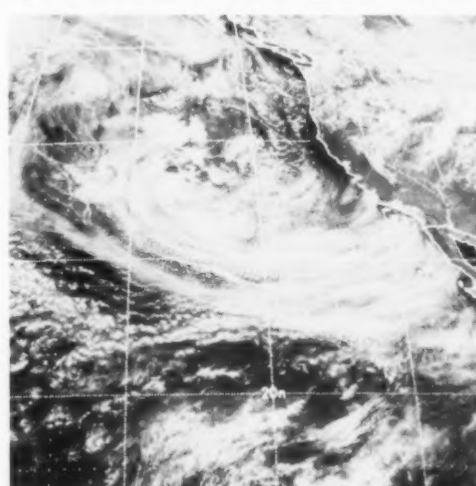


Figure 51.--Typical appearance of the Pacific High when off the northern California coast.

the B.T. ALASKA measured 48 kn; the 8th and 9th when the EXXON NEW ORLEANS measured 45-kn winds and 15-ft waves (fig. 51). The cargo shifted on the barge FOSS 290 off San Francisco on the 8th in gale-force winds and 25- to 30-ft waves. The 17th, 18th, and 19th the SEA-LAND PATRIOT reported 40 kn with 12-ft waves. There was an exceptionally long continual tight gradient from the 23d through the 28th and the CHEVRON LOUISIANA measured 32-kn winds and 21-ft waves, among many others reporting.

Casualties--The Japanese Maritime Safety Agency reported 10 ship collisions in fog off Japan early on the 11th. Eight seamen were missing and three ships sank. Among the ships were the RYOEI MARU and JERRYEVERETT, also the SAM YANG No. 101 and the TATSU MARU, a fishing vessel and the SUN MERCURY, and MALACCA MARU with the SHUNAN MARU.

These ships suffered heavy weather damage during the month: the CHAR HSING, MENDOZA, PARAMOUNT, and TROSS.

Other Casualties-- The ATLAS DAMPIER suffered heavy weather damage in Bass Strait while attempting to aid the MOBIL AUSTRALIS which was stranded in high seas without steering. The ERNAM reported Colombo with cracked shell plating due to weather.

WEATHER LOG, JUNE 1982--The primary track of the low-pressure centers closely followed climatology from near Tokyo to midocean near 49°N, 180°. At that point the track split with a few continuing northeastward while others tracked eastward to later curve counterclockwise into the Gulf of Alaska near the Kenai peninsula. North of the primary track the tracks were scattered and generally crossed the Bering Sea. A secondary track from the vicinity of 40°N, 155°W stretched to the Washington State coast.

There were major differences between the mean sea-level pressure pattern for the month and climatology. The Aleutian Low at 1001 mb was 9 mb lower than the normal but at 55°N, 180° near its normal position. A secondary LOW over Alaska did not exist. The Pacific High was larger than normal with four centers. The strongest was 1023 mb near 31°N, 180° rather than the normal of 1024 mb near 33°N, 145°W. The three other centers were alined north-south along 138°W with 1020 mb at 52°N, 1021 mb at 39°N, and 1021 mb at 33°N (fig. 52).

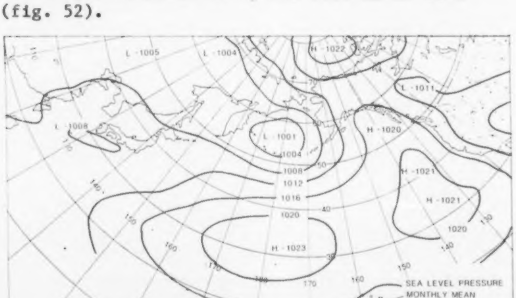


Figure 52.--Mean sea-level pressure, June, 1982.

There were four significant anomaly centers; minus 10 mb near 55°N, 178°E, plus 6 mb near 34°N, 176°E, minus 4 mb near 36°N, 148°W, and plus 4 mb near 58°N, 139°W.

The upper-air pattern at 700 mb was closer to normal than the surface. The gradient and height centers were more intense. The LOW over the Bering Sea was 92 m lower than its climatic counterpart and the subtropical High was 29 m higher and about 40° longitude west of its climatic counterpart. The long-wave troughs were over the Sea of Japan and approximately 155°W.

There were three tropical cyclones in the western North Pacific, typhoon Ruby and tropical storms Tess and Skip. Tropical storm Bud was over the eastern ocean.

Extratropical Cyclones--The first week of the month started off with high pressure off the Oregon coast which gradually split into two highs, the second over midocean. Cutoff lows formed between and south of the two highs. Lows and frontal waves were located farther northwest than usual and tracked into the Bering Sea. By the end of the second week the pattern had reverted to one High off California. During the third week the Pacific High split again into two centers and the fourth week there were three high centers. The Lows were generally weak. A Low moved into the Washington coast between two high cells the last week.

There was a weak quasi-stationary LOW on the east coast of Kamchatka on the 2d. Frontal waves were moving northeastward south and east of Japan. Several ships had gales and waves up to 20 ft east of northern Honshu. The BRITISH SECURITY measured 47-kn winds east of Tokyo. The EASTERN WORLD had 20-ft waves. By the 3d a series of the waves fortified the northern center and the THAMESFIELD (50°N, 176°W) measured 44-kn southeasterly winds and 26-ft seas. Others had gales and strong gales in the southerly flow particularly. The storm was moving across the Bering Sea along the 57°N parallel. The higher winds were north of latitude 50°N on the 4th and 5th. The PAN WESTERN measured 68-kn winds on the 6th. The storm turned northward through the Bering Strait and into the East Siberian Sea.

This LOW formed over the Sea of Japan on the 6th. It traveled as an open frontal wave until the 9th when it combined with another frontal wave from south of Honshu into a large storm. The TOMEI MARU (47°N, 180°) measured 39-kn winds with 16-ft waves. At 0000 on the 10th the LOW was 974 mb near 55°N, 178°E (fig. 53). There were gales on the 10th and the MEKHANIK GORDIENKO (51°N, 175°W) had 23-ft seas. The ORIENTAL IMPORTER found 20-ft waves near 50°N, 180° on the 11th. The storm was weakening and crossed the Alaska Peninsula on the 12th and finally disappeared on the 15th.

As a LOW out of China moved over southern Honshu another center formed to the northeast and the first dissipated. The GENTLE RIVER (37°N, 156°E) measured 62-kn southerly winds with 13-ft waves.

Figure 53.--A rather large deep storm for June.

The VENUS DIAMOND close by measured only 36 kn. At 0000 on the 16th the storm was 980 mb near 48°N, 157°E. The NARYVNEFT (53°N, 158°E) measured 50-kn northeasterly winds and 39-ft waves. Other ships were finding gales and strong gales with waves up to 20 ft. The storm turned northward on the 17th. The PRESIDENT JACKSON (49°N, 165°E) had 40-kn winds and 33-ft swell waves at 1800 on the 16th and 45 kn with 21-ft waves at 0000 on the 17th (fig. 54). The storm turned southwestward on the 18th as it deteriorated rapidly.

Figure 54.--No wonder forecasting is so difficult, even small islands have their influence, note the clear area on the leeward side (north) of the Andreanof Islands.

The chart of 0000 on the 18th was the first indication of this frontal wave. At 1200 the TOYOTA MARU No. 16 measured 40-kn winds south of the center near 37°N, 160°E. Early on the 19th the BYAKUDAN MARU was at the cold front with 25-ft swells. The SEA-LAND MARINER (44°N, 179°W) found 40-kn winds and 15-ft seas. The storm had been racing along at an average of 45 kn but slowed to 15 kn on the 20th. The winds were gales on the 20th with some 20-ft swells. The storm settled near 55°N, 175°W on the 22d and circled near there until disappearing on the 24th.

Monster of the Month--Two good ship reports and two island reports identified and located this developing frontal wave south of Tokyo on the 21st. The storm was developing a good circulation on the 23d with a few gales and waves to 20 ft. The S. IRENE (43°N, 167°E) reported 50-kn winds and 26-ft seas on the 24th. The storm was 984 mb near 48°N, 173°E at 1200. There were many more gale-force or higher winds on the 25th with some over 40 kn. A Japanese vessel measured 46-kn winds about 200 mi south of the center and the TOWER BRIDGE had 23-ft waves about 400 mi east of the center.

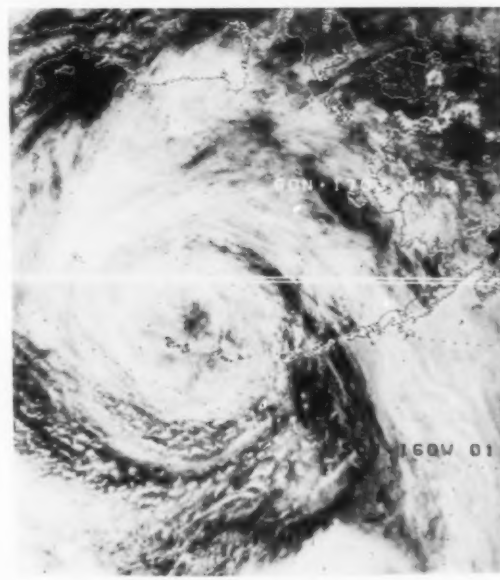


Figure 55.--The center of the storm was just north of Adak Island on the 16th.

The storm center crossed northward over the Aleutians late on the 25th (fig. 55). On the 26th the QUATSINO SOUND (49°N, 178°W) measured only 35-kn winds but the swells were 30 ft. This storm was one of the larger low-pressure areas of the month. On the 27th a frontal wave was racing through the southern quadrant forcing cyclonic curvature as far south as latitude 30°N. The tightening of the gradient south of the wave produced some gales and 20-ft waves. The YUGOH MARU (52°N, 161°W) east of the center and north of the frontal wave found easterly 33-ft swells.

On the 28th the original LOW was weakening and the frontal wave became the primary storm. The PAN NOVA (53°N, 156°W) southeast of the new storm reported 60-kn winds but no waves to verify the wind. The observation looked good. The other higher winds were mostly gales with waves up to 20 ft. The storm circled over the eastern Bering Sea and died out on the 30th.

Casualties--The LIECHTENSTEIN suffered heavy weather damage in the South China Sea on the 4th. The PINOLA had a broken rudder off Borneo in heavy weather and went aground. The RODOSI requested a survey of weather damage during mid-June.

Other Casualties--The NEW ZEALAND CARIBBEAN arrived Sydney on the 17th with weather damage from the 5th. A cargo of large steel pipes broke loose. The fishing vessel IMLAY sank in high seas when fish clogged the wash ports. The TASMAN VENTURE picked up three trawlermen adrift for 6 days in the Bass Strait. The MOUNT DIRFYS sustained a crack in the forward bulkhead in heavy weather and was being towed to Dubai with a 20° list.

Hurricane Alley

Dick DeAngelis
Environmental Data and Information Service, NOAA
Washington, D.C.

The tropical cyclone tracks (fig. 57) and summaries that follow are based on data provided by the National Hurricane Center, the Eastern Pacific Hurricane Center, the Naval Environmental Prediction Research Facility, the Joint Typhoon Warning Center, and the Australian Bureau of Meteorology.

TROPICAL CYCLONES - APRIL 1982

Four tropical cyclones developed during this transitional month. This is close to the average of three. The unusual occurrence was that all four reached hurricane strength. Bernie developed on the 1st. He reached hurricane intensity early on the 4th when winds increased to 70 kn around a 975-mb center. Late on the 5th Bernie's central pressure dropped to 960 mb and winds were estimated at 95 kn. Bernie maintained hurricane intensity until the 7th. Meanwhile Dominic had come to life in the Gulf of Carpentaria. He reached hurricane strength on the 6th. Peak intensity occurred the following day as winds reached 70 kn around a 950-mb center.

In the Bay of Bengal a severe cyclone formed on the last day of the month while the day before hurricane Karla in the South Indian Ocean had just reached her peak with 100-kn winds. The Bay of Bengal storm intensified as it moved across the Bay toward Burma. It reached hurricane strength on May 2 and continued to intensify on the 3d (fig. 56). By the 4th before moving inland the cyclone was generating 125-kn winds. Moving into southwest Burma the cyclone wreaked havoc and in its wake left 11 dead and 7,200 people homeless.

Figure 56.--Cyclone 20-82 at hurricane strength on the 3d, the day before reaching peak intensity.

TROPICAL CYCLONES - MAY 1982

May activity was about normal although the formation of tropical storm Claudia in the Australia-South Pacific region is uncommon for this late in the season. The other two storms formed in the North Pacific--Aletta in the east and Pat in the west.

Claudia developed in the Solomon Islands close to the area affected by Bernie the previous month. On the 15th she reached tropical storm strength as she neared the 15th parallel. At this time Claudia was turning a large counterclockwise loop. Maximum winds near her center climbed to 40 kn late in the day. While Claudia was dissipating on the 17th far to the northwest, Pat was coming to life east of the Philippines. By the 19th he reached typhoon strength and was recurving off Luzon. The following day winds climbed to a peak of 105 kn. By the 22d, however, Pat was weakening rapidly as he passed through the Bonin Islands. This was about the time Aletta was making her appearance in the eastern half of the Pacific. Like most early season storms in this basin Aletta did not journey very far westward. Her maximum winds reached 45 kn with gusts to 60 kn on the 24th and 25th as she turned a clockwise loop.

TROPICAL CYCLONES - JUNE 1982

June was more active than normal as seven storms came to life, all in the Northern Hemisphere, compared to an average of four to five. However only three gained hurricane strength.

In the central Bay of Bengal a severe storm developed on the first day of the month. Before it moved ashore on the 3d maximum winds had

Table 5.--Global tropical cyclone summary, April, May, and June 1982

No.	Name	Est. max. wind (kn)	Basin	Dates
		April 1982		
1	Bernie	95	Aust.-S. Pacific	1-9
2	Dominic	70	Aust.-S. Pacific	4-13
3	Karla	100	South Indian	23-May 2
4	20-82	125	North Indian	30-May 5
		May 1982		
5	Claudia	40	Aust.-S. Pacific	11-18
6	Pat	105	W. North Pacific	17-22
7	Aletta	45	E. North Pacific	22-28
		June 1982		
8	22-82	55	North Indian	1-4
9	Alberto	75	N. Atlantic	2-6
10	Bud	45	E. North Pacific	14-17
11	Ruby	75	W. North Pacific	18-28
12	-	60	N. Atlantic	18-20
13	Tess	35	W. North Pacific	28-July 2
14	Skip	50	W. North Pacific	29-July 1

Table 6.--Tropical cyclone watch, 1982

Western North Pacific

Mamie	TC-1	T	March
Nelson	TC-2	H	March
Odessa	TC-3	H	March
Pat	TC-4	H	May
Ruby	TC-5	H	June
Tess	TC-6	T	June
Skip	TC-7	T	June
Val	TC-8	T	July
Winona	TC-9	T	July
Andy	TC-10	H	July
Bess	TC-11	H	July
Cecil	TC-12	H	Aug.
Dot	TC-13	H	Aug.
Ellis	TC-14	H	Aug.
Faye	TC-15	H	Aug.
Gordon	TC-16	H	Aug.
Hope	TC-17	T	Sept.
Irving	TC-18	T	Sept.
Judy	TC-19	H	Sept.
Ken	TC-20	H	Sept.
Lola	TC-21	T	Sept.
Mac	TC-23	H	Oct.
Nancy	TC-24	H	Oct.
Owen	TC-26	H	Oct.

Central North Pacific

Akoni	1-C	T	Aug.
Ema	2-C	T	Sept.
Hana	3-C	T	Sept.

South Indian Ocean

--	1-82	T	Jan.
Chris	2-82	H	Jan.
Daphne	3-82	T	Jan.
Errol	4-82	T	Jan.
Electra	10-82	T	Feb.
--	12-82	T	Feb.
Justine	15-82	H	March
--	16-82	T	March
Karla	19-82	H	April
--	15-83	T	July

North Indian Ocean

--	20-82	H	May
--	22-82	T	June
--	23-82	T	Oct.

Eastern North Pacific

Aletta	Td-1	T	May
Bud	Td-4	T	June
Carlotta	Td-6	T	July
Daniel	Td-8	H	July
Emilia	Td-9	T	July
Fabio	Td-12	H	July
Gilma	Td-13	H	July
Hector	Td-14	H	July
Iva	Td-15	T	July
John	Td-16	H	Aug
Kristy	Td-17	H	Aug.
Lane	Td-18	T	Aug.
Miriam	Td-19	H	Aug.
Norman	Td-20	H	Sept.
Olivia	Td-23	H	Sept.
Paul	Td-22	H	Sept.
Rosa	Td-24	T	Oct.
Sergio	Td-25	H	Oct.
Tara	Td-26	T	Oct.

Australia-South Pacific

Bruno	5-82	T	Jan.
--	6-82	T	Jan.
Hettie	7-82	H	Jan.
Abigail	8-82	H	Jan.
Graham	9-82	T	Feb.
Harriet	11-82	T	Feb.
Ian	13-82	H	Feb.
Isaac	14-82	H	March
Bernie	17-82	H	April
Dominic	18-82	T	April
Claudia	21-82	T	May
Joti	02S-83		Oct.

North Atlantic

Alberto		H	June
--		T	June
Beryl		T	Aug.
Chris		T	Sept.
Debby		H	Sept.
Ernesto		T	Oct.

climbed to 100 kn. As it ripped through the coastal districts of the state of Orissa, winds blew off thousands of roofs and at least 100 people were killed. Tens of thousands were left homeless by the raging winds and torrential rains. Worst hit was the densely populated Cuttack district. In the ore port of Paradip two ships and 15 trawlers were sunk.

Meanwhile in the North Atlantic an organized cloud system developed over the Yucatan Peninsula on the 1st. Within 24 hr, this system moved over the waters of the southeast Gulf of Mexico, spreading heavy rainfall eastward to western Cuba. Satellite pictures suggested that a depression was forming on the 2d and an Air Force reconnaissance aircraft located a closed circulation over the Yucatan Channel during that afternoon. The aircraft measured winds to 30 kn and a central sea level pressure of 1003 mb.

The depression moved east-northeastward and intensified. At 0600 on the 3d a ship located 100 mi south of the center reported 40-kn winds. Additional ships and an Air Force aircraft confirmed that windspeeds were gale force and tropical storm Alberto was named while centered just north of western Cuba and 150 mi southwest of Key West. Later in the day, the Air Force aircraft reported 65-kn surface winds and then a NOAA aircraft estimated surface winds of 75 kn along with a sea level pressure of 985 mb.

As soon as the hurricane warnings were posted the hurricane began to weaken and the 1632 report of 75 kn and 985 mb stands as the peak intensity for this storm. Alberto was a hurricane for less than 12 hr. It weakened to a tropical storm early on the 4th, while its track was turning sharply from a northeast heading to due west.

Alberto weakened to a depression early on the 5th and, by this time, the system had executed a small looping motion and was drifting slowly northeastward. It continued this drift until late on the 6th, when it dissipated while centered 60 mi off the southwest Florida coast.

Maximum winds observed at a land station were 60 kn at Dry Tortugas at 2200 on the 3d, when the center was less than 20 mi west of the island. Key West measured 6.25 in of rain in 24 hr. Several reports of tornado activity were received from the lower Keys. Newspaper accounts of the effects on western Cuba include over 14 in of rain and 23 deaths from inland flash flooding, as well as damage to the Cuban tobacco crop.

During midmonth Bud, Ruby, and a subtropical storm developed in the Northern Hemisphere. Bud popped up in the eastern North Pacific on the 14th just southeast of where Aletta formed the previous month. Moving toward the west-northwest maximum winds climbed to 45 kn on the 16th. However the following day Bud dissipated.

Ruby came to life in the central Caroline Islands on the 18th. While developing she

skirted the Mariana Islands, on a northward heading. By the 24th Ruby reached typhoon strength just before crossing the 20th parallel. The following day she reached maximum strength with 75-kn winds close to her center. Ruby remained at typhoon strength as she brushed Honshu on the 27th. Her winds and seas played havoc with the fishing fleets. The TAKOJIMA MARU No. 8 with a crew of 22 was declared missing in heavy weather on the 27th, near the storm's center. Twenty-one crewmen, one dead, were picked up by their consort vessel. Meanwhile the SHOKHI MARU No. 10 capsized on the 27th about 136 mi east of Kinkasan. All 19 of her crew were rescued by her consort vessel. Ruby weakened and finally dissipated over Shikoku on the 28th.

In the North Atlantic a subtropical storm formed off the Yucatan Peninsula on the 18th just west of where Alberto formed a few weeks earlier. Although such an occurrence is unusual, a remarkably similar storm formed in the same area during June 1974.

The tropical disturbance can be traced to the northwest Caribbean Sea on the 15th. During the following 2 days most of the convection moved through the Yucatan Channel into the southeastern Gulf of Mexico while a low pressure center formed over the Yucatan Peninsula. The low pressure system was most clearly evident at the 700 and

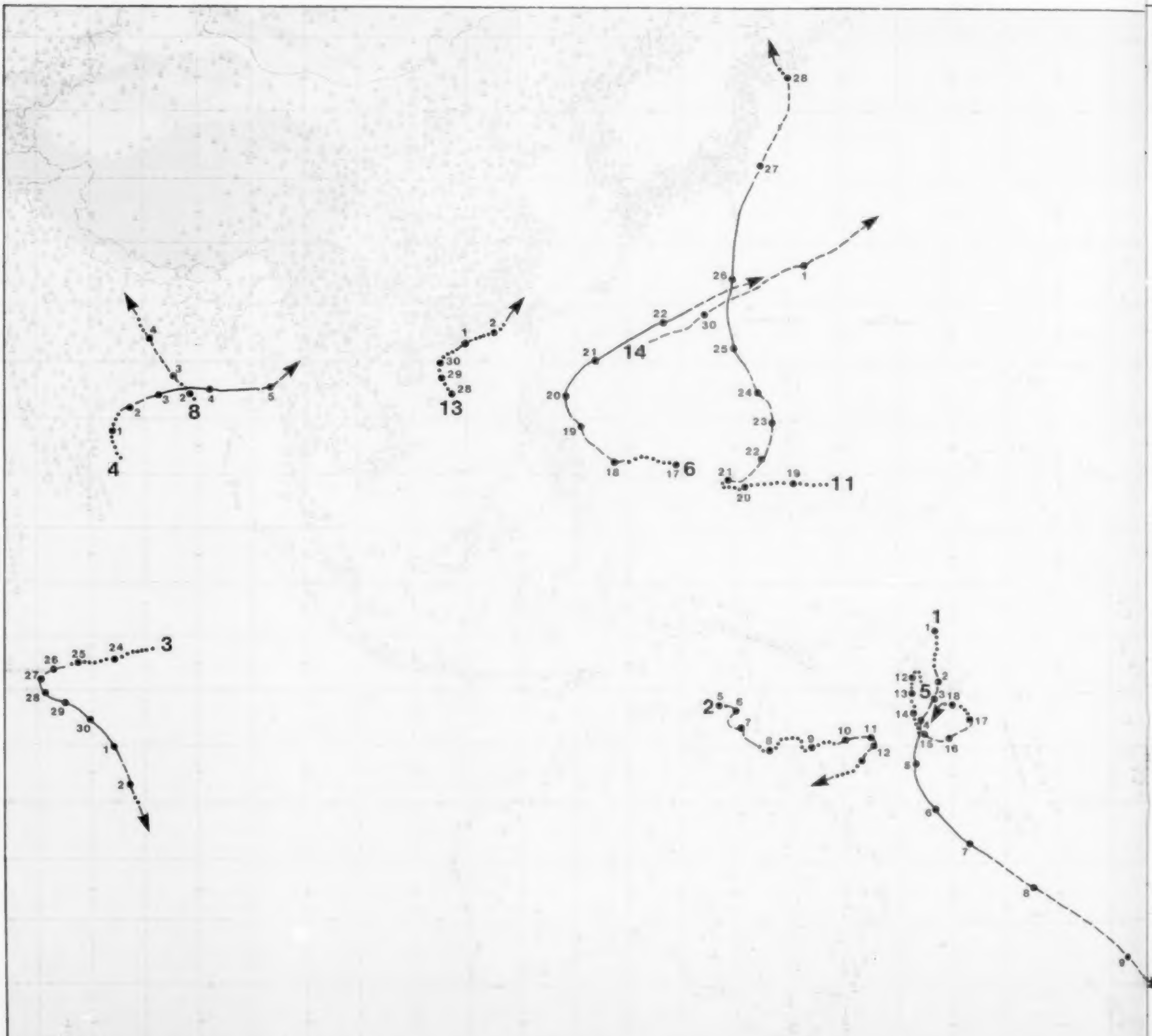
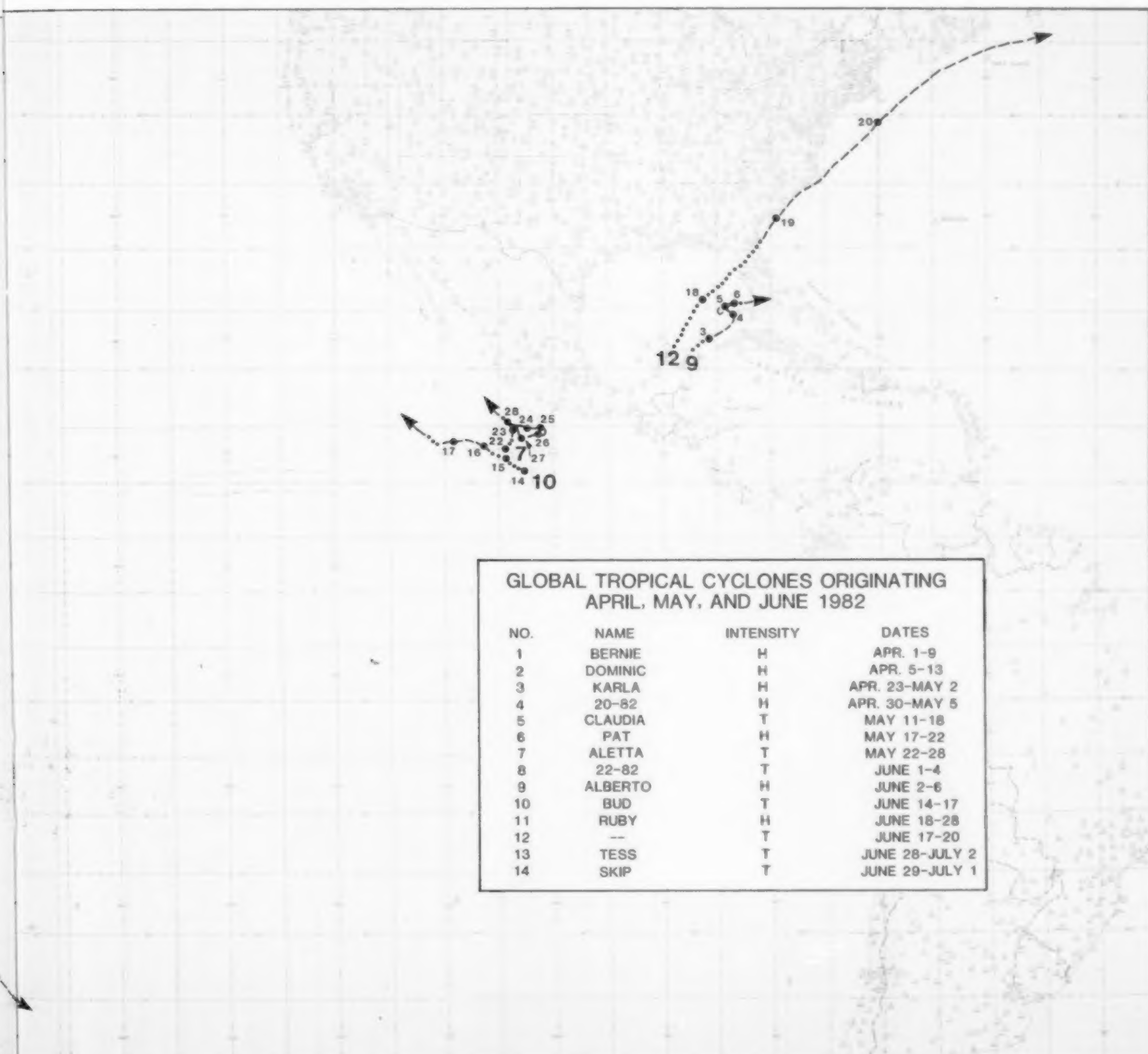


Figure 57.--Global tropical cyclones, April, May, June, 1982.

500 mb levels.

At 0000 on the 18th, the 850-mb winds at Tampa and West Palm Beach were southerly at 40 kn. Therefore, the synoptic situation over the Florida peninsula was characterized by a strong southerly flow of moist tropical air at low levels superimposed by a strong westerly current aloft--a classic situation for the development of severe weather over the state. In fact, some severe weather had been occurring over the peninsula as early as the 16th as the fringes of the disturbance moved across the Florida Straits and over the peninsula. Radars showed severe thunderstorm cells moving rapidly northward over the peninsula during the night of the 18th. Cell movement was frequently in excess of 40 kn. During the predawn hours of the 18th, radar at Tampa showed increasing curvature of the rainbands which indicated that a center of circulation was forming near the upper west coast of the peninsula.

Preliminary information indicates three storm-related deaths, at least 13 injuries, and 25 homes destroyed in Florida. A Brevard County woman was drowned when a canoe overturned, a year-old child was killed when swept into a drainage ditch in Orange County, and a Hendry County man was killed when his mobile home was destroyed by a tornado. A preliminary assessment of dollar damages compiled by a state disaster



GLOBAL TROPICAL CYCLONES ORIGINATING APRIL, MAY, AND JUNE 1982

NO.	NAME	INTENSITY	DATES
1	BERNIE	H	APR. 1-9
2	DOMINIC	H	APR. 5-13
3	KARLA	H	APR. 23-MAY 2
4	20-82	H	APR. 30-MAY 5
5	CLAUDIA	T	MAY 11-18
6	PAT	H	MAY 17-22
7	ALETTA	T	MAY 22-28
8	22-82	T	JUNE 1-4
9	ALBERTO	H	JUNE 2-6
10	BUD	T	JUNE 14-17
11	RUBY	H	JUNE 18-28
12	--	T	JUNE 17-20
13	TESS	T	JUNE 28-JULY 2
14	SKIP	T	JUNE 29-JULY 1

team places losses at $6.8 million, but totals for Lee, Collier, Pasco, and Hillsborough Counties are still incomplete. High tides and waves caused flooding and beach erosion from Naples to the Tampa Bay area. Some waterfront buildings suffered damage from undermining and there was widespread damage to marinas and small boats. One-hundred thirty families were eventually evacuated from the Arcadia area as the Peace River crested above flood stage a few days after the storm.

The highest winds noted thus far in Florida were 36 kn with gusts to 42 kn during a thunderstorm at Macdill AFB in Tampa on the 18th. Storm rainfall amounts generally ranged from 4 to 6 in except in the extreme northeast part of the state where more than 8 in fell at Hastings and St. Augustine.

As the LOW accelerted to a forward speed of more than 30 kn and emerged off the northeast coast of Florida at 1600 on the 18th, it was designated a subtropical storm. An Air Force reconnaissance flight found surface winds of 60 kn and a central pressure of 992 mb during the afternoon. From the time the storm moved off the Florida coast until it became extratropical just south of Newfoundland on the 20th, it followed a steady northeast heading and maintained a nearly constant strength of about 60 kn. However its forward speed slowed to about 15 kn off the South Carolina coast, then accelerated rapidly, reaching 45 kn off the coast of Nova Scotia. The central pressure remained about 992 mb until the morning of the 20th when it lowered to 984 mb as the center passed Sable Island.

The storm's effects on land areas north of Florida were relatively minor. Rains of up to 9 in in extreme eastern South Carolina and 4 in in eastern North Carolina caused some stream and urban flooding, and tides of 2 to 3 ft above normal caused minor beach erosion. A 68-ft fishing trawler sank in high seas at 0930 on the 19th, about 65 mi southeast of Cape Fear, N.C., but the crew was rescued by the Coast Guard.

Winds reached 40 kn with gusts to 58 kn at the Oak Island Coast Guard station near Cape Fear, N.C., and 47 kn with gusts to 67 kn at the offshore tower at Frying Pan Shoals about 40 mi southeast of Cape Fear on the 18th. Sustained winds of 60 kn were measured at Frying Pan early on the 19th. A ship encountered southeast winds of 35 kn with gusts to 60 kn along with 15- to 20-ft seas and a pressure of 993.9 mb, 52 mi southeast of Cape Fear at 0600 on the 19th.

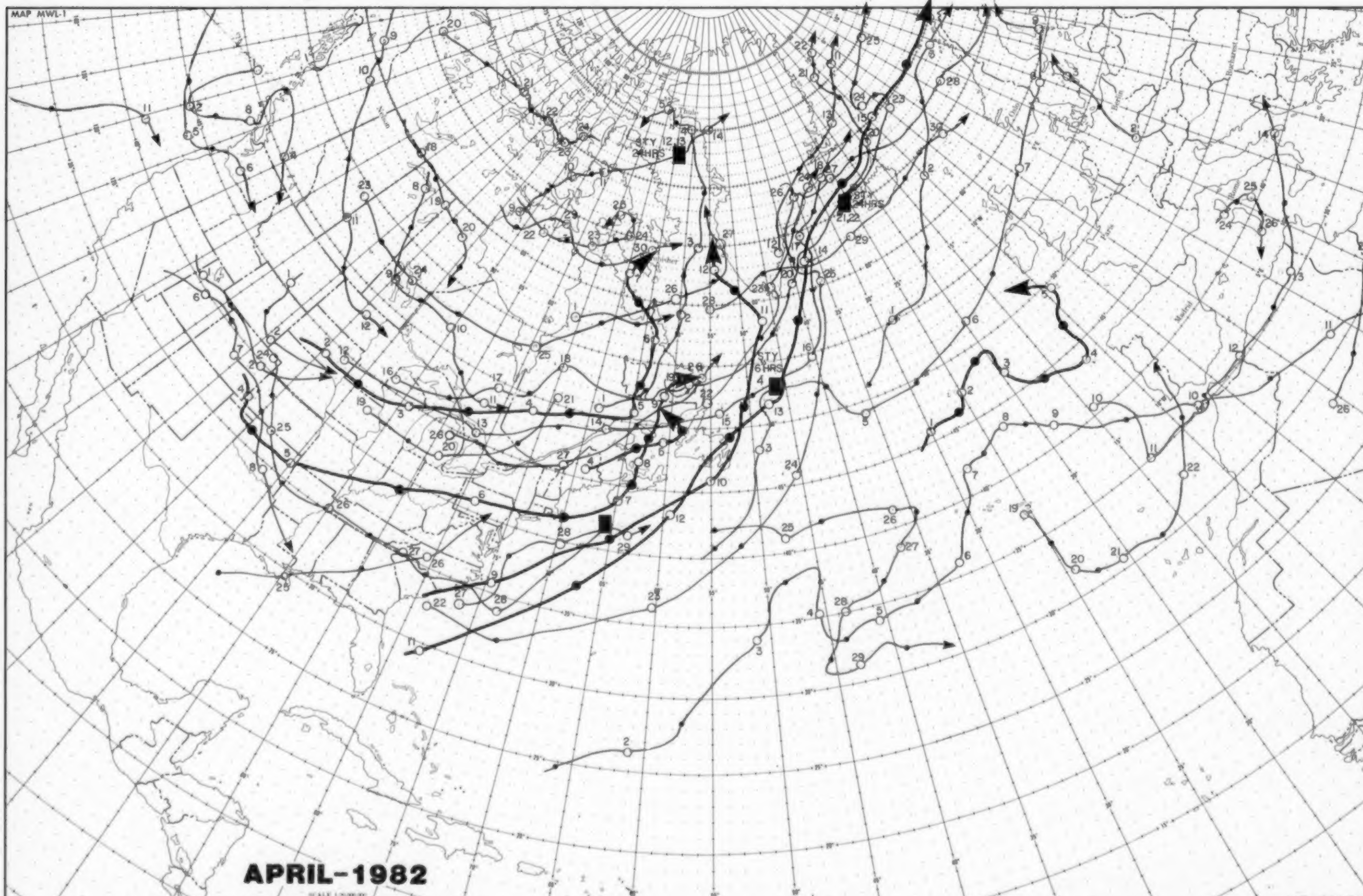
After crossing the Outer Banks of North Carolina, the storm remained sufficiently far at sea so as not to affect significantly the East Coast from Virginia northward. Even though the central pressure remained low and gales covered a broad area, the storm center expanded and became distorted on June 20 as it passed near the southeast tip of Newfoundland.

Tropical storms Tess and Skip formed near the end of the month in the western North Pacific. Tess developed about 180 mi southeast of Hainan. Winds climbed to minimum tropical storm strength as the storm brushed Hong Kong late on the 30th. By July 2 Tess had dissipated in the Formosa Strait. Skip meanwhile had formed in the northern Philippine Sea. His winds reached 50 kn on July 1.

HURRICANE HAVENS HANDBOOK

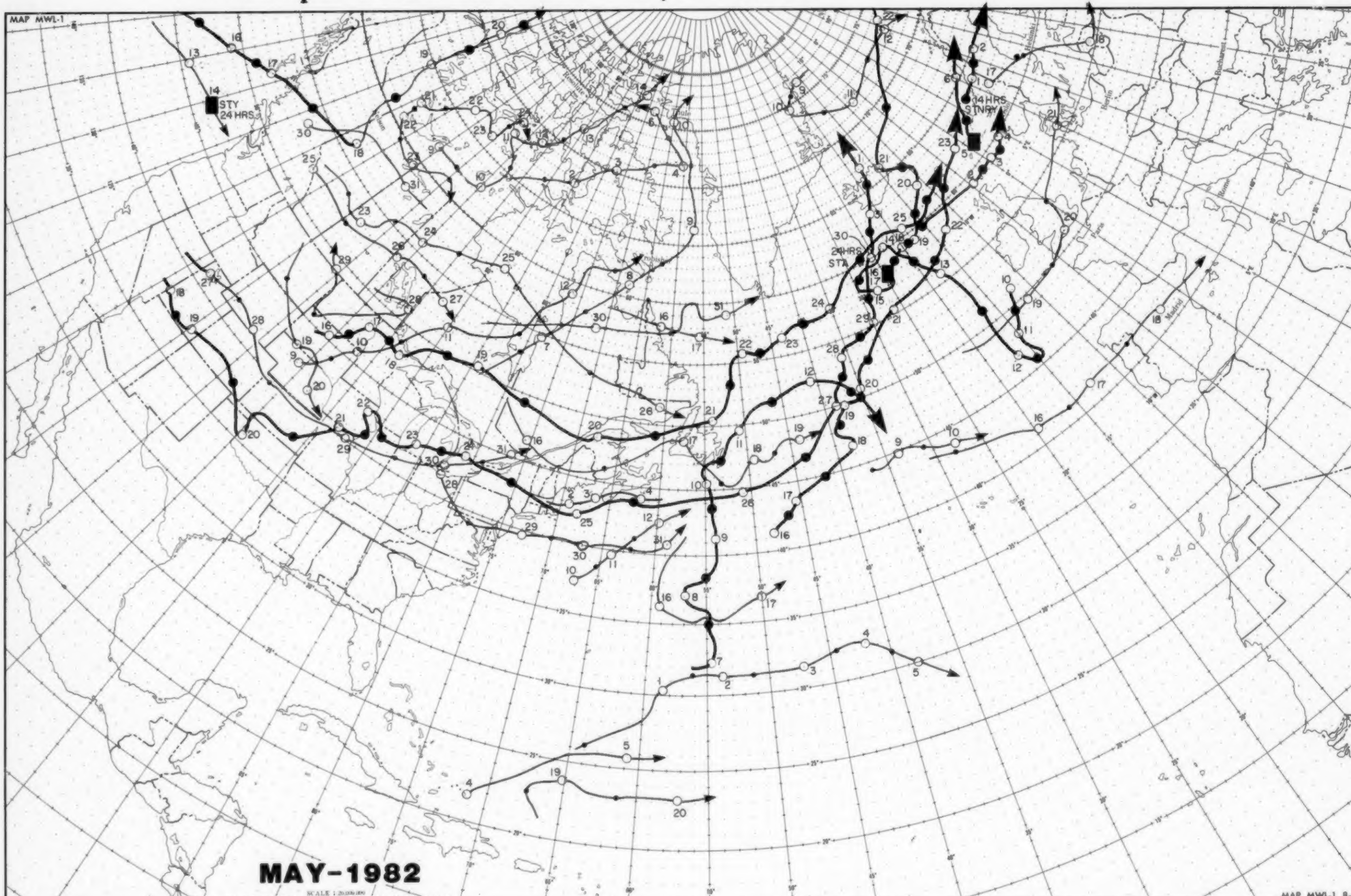
The Hurricane Havens Handbook for the North Atlantic Ocean was published by the Naval Environmental Prediction Research Facility as NEPRF Technical Report TR82-03 in June 1982. This first edition includes nine ports: Norfolk, VA; Charleston, SC; Key West, FL; Mayport, FL; Kings Bay, GA; Morehead City, NC; New London, CT; Pensacola, FL; and Gulfport, MS. There will be more concerning this valuable publication in the next issue. Copies of the report may be obtained by writing the: Commanding Officer, Naval Environmental Prediction Research Facility, Monterey, CA 93940. The cost is not known.

Principal Tracks of Centers of Cyclones at Sea Level, North Atlantic



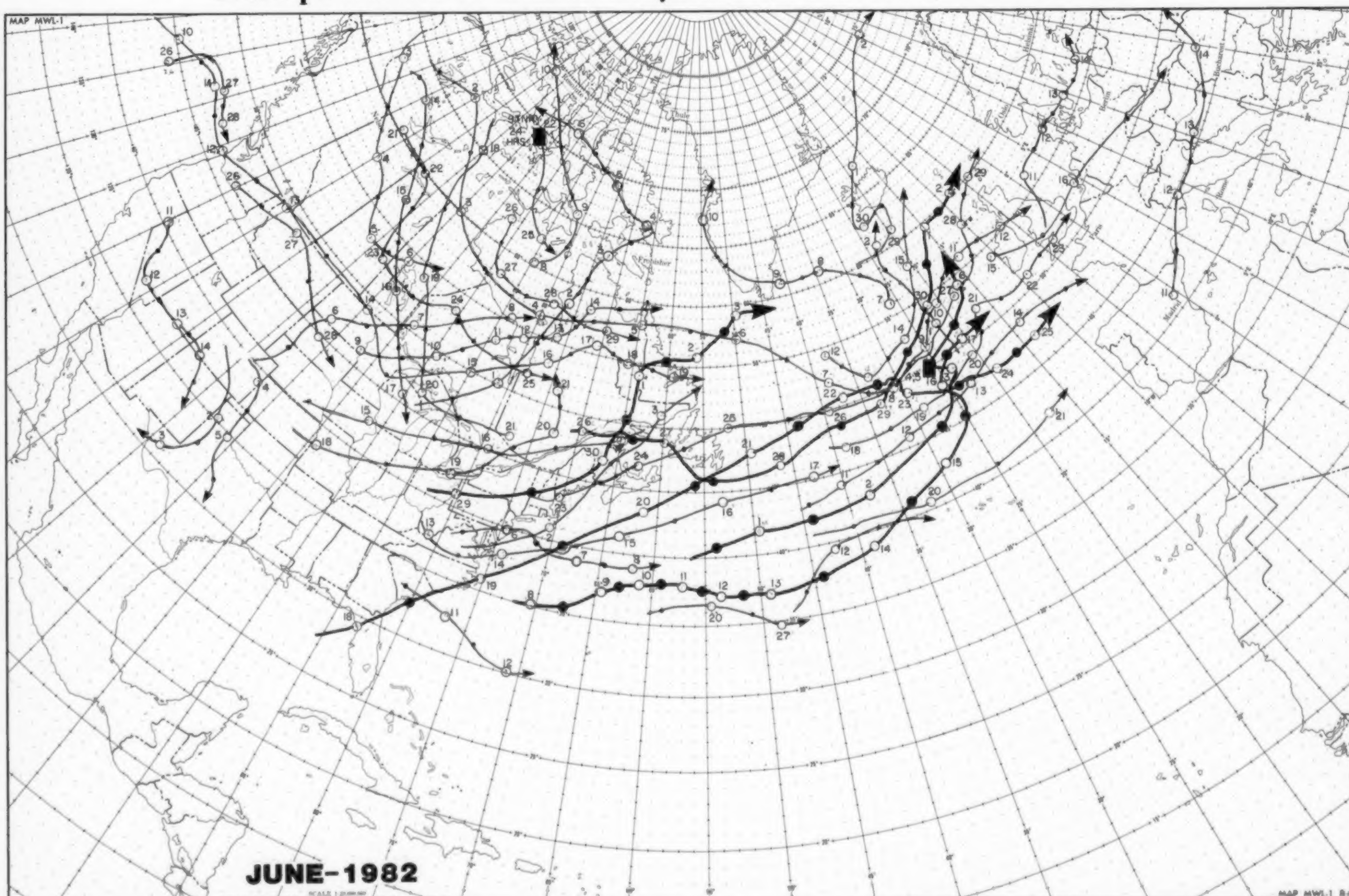
Closed circle indicates 0000 and open circle 1200 GMT positions. Square indicates stationary center. Cyclone tracks marked with a heavy line are described in the Weather Log.

Principal Tracks of Centers of Cyclones at Sea Level, North Atlantic



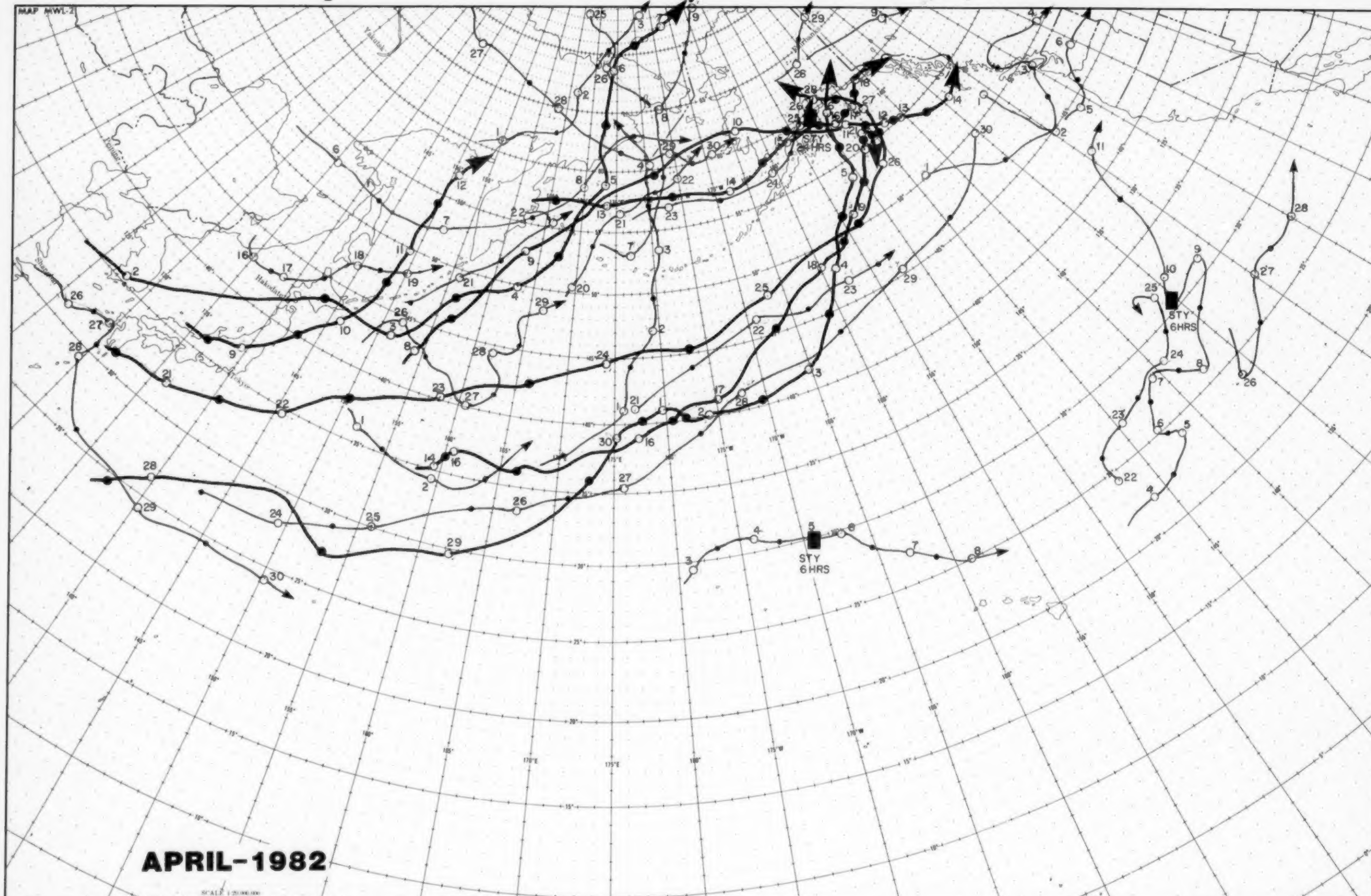
Closed circle indicates 0000 and open circle 1200 GMT positions. Square indicates stationary center. Cyclone tracks marked with a heavy line are described in the Weather Log.

Principal Tracks of Centers of Cyclones at Sea Level, North Atlantic



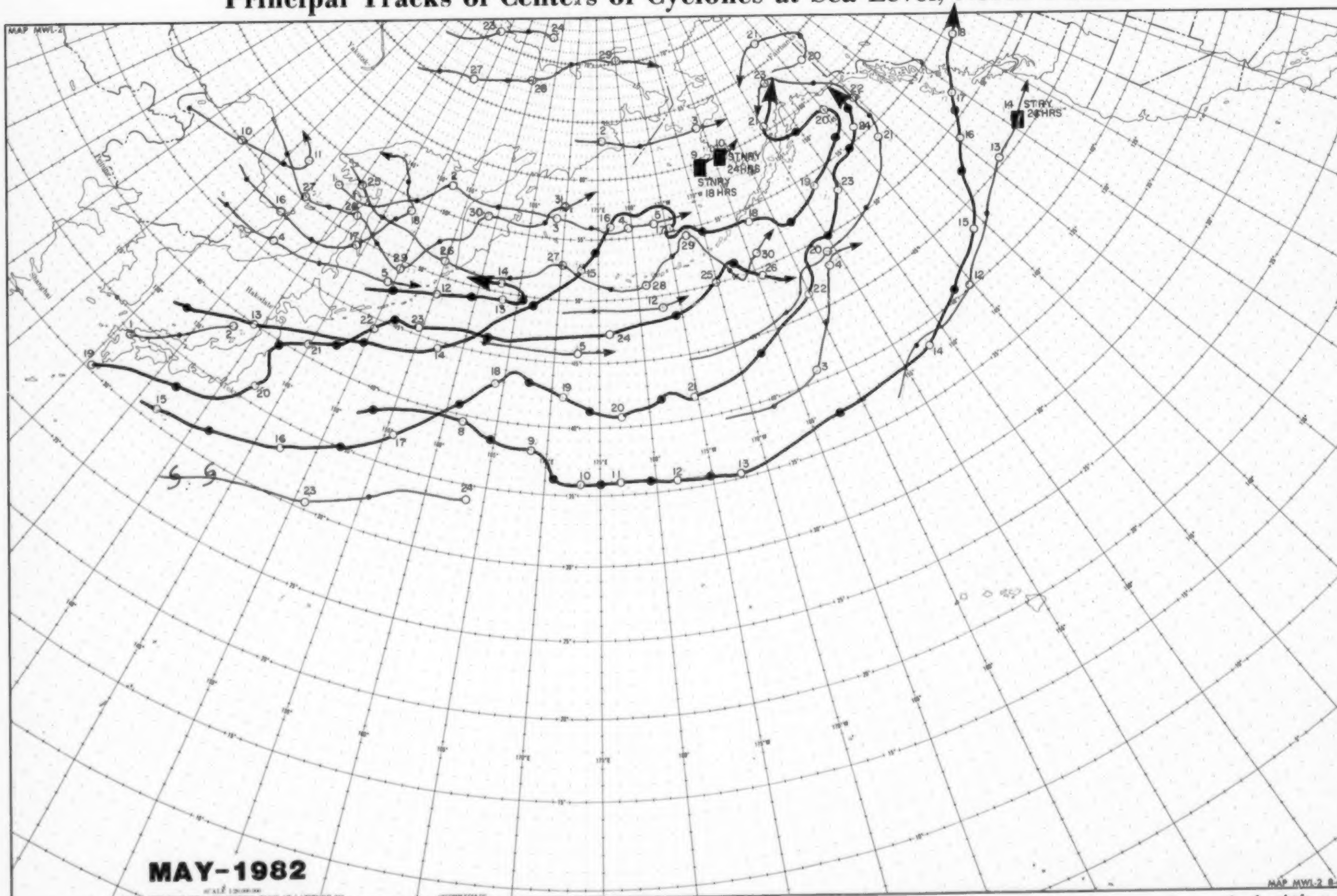
Closed circle indicates 0000 and open circle 1200 GMT positions. Square indicates stationary center. Cyclone tracks marked with a heavy line are described in the Weather Log.

Principal Tracks of Centers of Cyclones at Sea Level, North Pacific



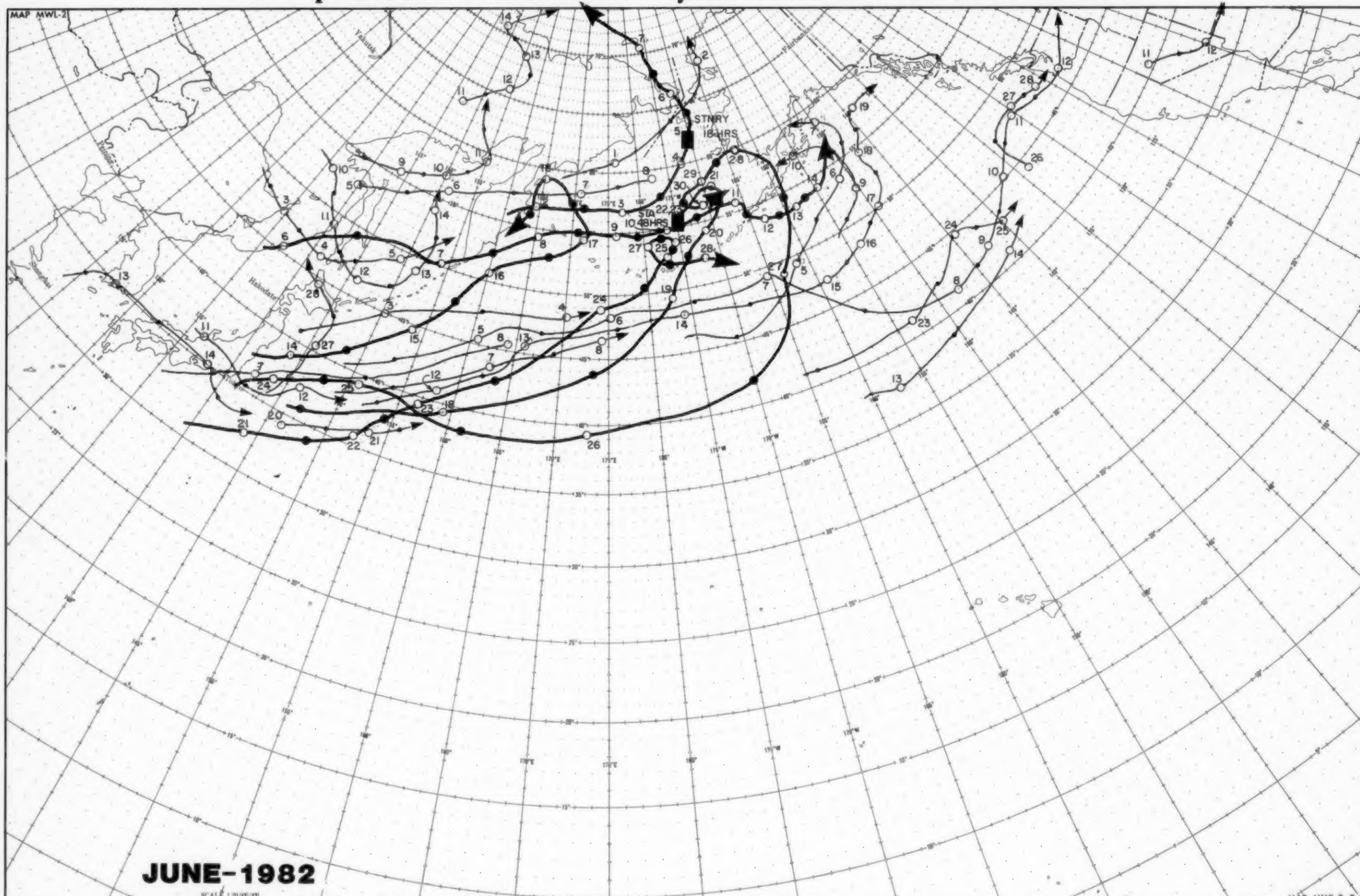
Closed circle indicates 0000 and open circle 1200 GMT positions. Square indicates stationary center. Cyclone tracks marked with a heavy line are described in the Weather Log.

Principal Tracks of Centers of Cyclones at Sea Level, North Pacific



Closed circle indicates 0000 and open circle 1200 GMT positions. Square indicates stationary center. Cyclone tracks marked with a heavy line are described in the Weather Log.

Principal Tracks of Centers of Cyclones at Sea Level, North Pacific



Closed circle indicates 0000 and open circle 1200 GMT positions. Square indicates stationary center. Cyclone tracks marked with a heavy line are described in the Weather Log.

North Atlantic Selected Gale and Wave Observations

North Atlantic Selected Gale and Wave Observations

April, May and June 1982

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C. Air	Temperature °C. Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
ATLANTIC	APR.															
GVOC	2	28.9 N	36.5 W	06	34	M 45	5 NM	15	1015.5		16.2	5	19.5	31	10	24.5
UZFP	2	05.4 N	27.7 W	06	03	58		-	1022.3	28.0	30.0					
ELIN	2	31.9 N	28.7 W	18	30	M 20	10 NM	02	1016.9	17.2	18.7	4	5	34	10	24.5
GZMC	2	40.6 N	33.8 W	18	34	M 42	10 NM	81	1012.6	8.5	14.4	6	23	34	8	32.5
GVOC	3	41.1 N	30.0 W	00	31	M 47	5 NM	13	1006.6	16.6	15.2	5	14.5	33	8	28
WVFN	3	46.0 N	49.3 W	09	18	M 12	.5 NM	61	1002.5	2.0	1.0	7	24.5			
GYAP	3	34.5 N	49.5 W	12	15	M 45	1 NM	65		17.0	18.0	5	13	15	6	24.5
GZML	3	47.4 N	26.7 W	12	36	M 37	5 NM	02	1008.6	11.2	11.9	5	8	01	8	24.5
KSLJ	3	39.8 N	29.4 W	12	32	25	10 NM	02	1013.4	14.0	14.0	8	11.5	32	12	24.5
EIDF	3	36.4 N	45.4 W	18	16	52	2 NM		1001.6	16.0	17.0	7	14.5	16	10	19.5
EWVO	4	40.7 N	64.1 W	00	06	80	10 NM									
GLGA	4	36.4 N	23.4 W	00	26	M 35	10 NM	02	1014.5	15.0	15.3	4	11.5	26	9	32.5
GTOZ	4	21.1 N	74.2 W	00	22	M 33	10 NM	25		25.3	26.6	23	37.5	06	4	6.5
GVOC	4	44.1 N	21.3 W	00	36	32	10 NM		1001.3	12.6	13.0	4	11.5	34	10	29.5
GWOL	4	39.3 N	75.0 W	00	02	38		01	1003.6	17.8	22.4	6	16.5	18	8	32.5
VCBT	4	48.7 N	49.4 W	12	27	M 50			0999.0	- 4.0	1.0			27	7	8
DDLH	4	38.3 N	66.8 W	15	01	71										
SMPO	4	39.4 N	60.0 W	18	20	M 50	5 NM	50	1001.5	19.7	19.0	5	13	20	20	14.5
PECO	4	32.2 N	45.1 W	18	22	M 58	5 NM	50	1000.0	17.3						
WGJC	4	32.2 N	31.2 W	18	17	M 15	10 NM	03	1018.5	19.0	16.0	4	1.5	36	10	37.5
WLGF	4	46.3 N	33.9 W	18	15	35	5 NM	2[illegible]	0999.8	12.2	11.1	8	14.5	15	12	24.5
SHJA	5	46.1 N	46.9 W	00	27	M 58	5 NM	02		0.5		5	6.5	32	8	11.5
WDJC	5	31.9 N	33.9 W	00	18	M 20	5 NM	03	1014.5	19.0	17.0	3	6.5	36	10	37.5
KFEM	5	48.0 N	34.1 W	12	25	29	5 NM	80	1009.7	8.8	11.7	6	14.5	23	9	24.5
PONP	5	40.5 N	69.0 W	12	28	M 48	5 NM	23	1006.7	- 1.0	7.4	6	29.5			
GPUJ	5	27.3 N	38.3 W	18	24	32	10 NM	05	1008.1	20.8	21.0	3	5	26	10	24.5
VGLO	5	49.3 N	66.5 W	18	27	55	5 NM	02								
RIGG	6	46.7 N	49.0 W	03	13	M 48	1 NM	51	0994.8	2.6	0.4	7	8	36	9	6.5
GPUJ	6	26.2 N	40.9 W	06	30	20	10 NM	03	1013.7	19.9	20.0	2	5	30	8	32.5
KFEY	6	49.7 N	11.2 W	18	20	48	2 NM	63	0999.9	12.5	10.0	4	10	22	5	13
FNZF	7	40.6 N	70.7 W	00	32	M 53	2 NM		0981.0	- 0.5						
KFCS	7	49.6 N	14.2 W	06	22	40	5 NM	01	1002.1	10.0	10.6	6	10	22	14	26
GONP	7	38.5 N	67.6 W	12	30	M 58	5 NM	38	0992.2	2.5	17.3	4	11.5	29	8	18
H9KX	7	39.5 N	36.6 W	12	30	M 48	5 NM	03		17.0						
VSDT	7	44.9 N	66.0 W	12	03	M 51	1 NM	71	0974.0	- 2.0						
SLBU	7	38.3 N	72.2 W	18	32	52	5 NM		1010.0							
SMPO	7	37.1 N	68.3 W	18	27	M 60	2 NM	87	0997.5	7.5	24.0	6	23	26	10	23
KODW	7	36.9 N	52.4 W	18	20	M 48	5 NM	02	1003.0	17.8	18.3	5	11.5	20	6	13
KSLJ	7	40.4 N	62.9 W	18	28	48	10 NM	02	0987.0	5.0	17.0	8	10	26	11	24.5
PODZ	7	35.3 N	64.8 W	18	25	M 50	5 NM	25	1002.7	14.0	20.8	12	23			
PJYS	7	36.8 N	68.9 W	18	31	52	2 NM	27	1002.4	12.2	19.2	10	24.5	31	14	32.5
WDOP	7	38.6 N	71.4 W	18	32	45	5 NM	02	1004.5	0.9	10.0	6	13	30	8	26
WVFN	8	46.8 N	48.7 W	03	11	M 48	10 NM	61	0998.5	2.5	1.2	7	11.5			
FAMO	8	41.2 N	58.9 W	06	26	M 28	.25 NM		0989.0	9.0	14.0	6	10	20	8	26
DZWK	8	34.7 N	68.9 W	06	31	M 42	2 NM	15	1017.9	10.5	18.0	5	16.5	34	10	29.5
WMRU	8	30.4 N	69.8 W	06	34	27	10 NM	02	1017.8	14.0	22.2	4	13	34	6	26
RIGG	8	47.0 N	48.8 W	09	17	M 78	200 YD	45	0996.5	2.3	0.0	8	8			
SMPO	8	36.3 N	69.0 W	12	29	M 55			1009.0	10.0						
PODZ	8	35.1 N	58.7 W	12	24	48	10 NM			14.0						
WDOP	8	38.9 N	69.9 W	12	30	48	5 NM	01	1009.4	3.3	7.8	6	13	30	8	28
EWVO	8	40.9 N	63.8 W	18	29	45	2 NM	88	0990.0		4.5	8	26			
KFEM	8	42.5 N	61.7 W	18	24	45	10 NM	02	0991.0	1.1	1.1	8	16.5	24	14	26
KHLX	8	41.1 N	56.1 W	18	25	50	10 NM	02	0996.0	8.8	10.7	8	23	27	13	46
KSLJ	8	40.3 N	64.0 W	18	27	40	10 NM	02	1000.0	4.0	12.0	8	10	27	14	24.5
NKRV	8	29.3 N	60.6 W	18	32	17	10 NM	01	1020.5	18.8	20.6	5	6.5	32	9	26
WLSO	8	41.0 N	60.2 W	18	26	40	10 NM	23	0995.3	5.0	15.6	XX	13	26	14	24.5
WDOP	9	39.1 N	70.1 W	00	31	45	10 NM	01	1010.0	6.0	10.0	6	11.5	31	8	24.5
EWVO	9	41.1 N	64.1 W	06	30	M 45	2 NM	88	1002.1	- 4.0	8.1	8	26			
GXLE	9	37.4 N	41.6 W	06	21	M 16	10 NM	03	1017.7	17.2	16.0	4	5	29	8	26
GOVP	9	39.0 N	49.4 W	12	22	M 37	10 NM	64	1011.7	15.0	16.8	5	11.5	24	8	32.5
KODW	9	37.8 N	53.9 W	12	27	M 35	10 NM	02	1014.6	13.3	18.9	10	16.5	26	12	41
KFDZ	9	38.3 N	47.1 W	12	23	30	10 NM	02	1012.9	16.7	14.4	5	10	26	10	24.5
KHLX	9	38.6 N	56.9 W	12	29	50	5 NM	02	1009.2	12.8	16.2	6	26			
WLSO	9	39.6 N	61.9 W	12	28	40	10 NM	21	1009.8	7.7	14.4	2	13	27	14	29.5
ELIN	9	29.0 N	49.0 W	18	25	M 19	10 NM	01	1020.9	22.7	21.2	2	3	30	11	32.5
GOVP	10	39.1 N	50.7 W	00	25	M 19	10 NM	02	1019.4	15.0	15.0	5	8	29	8	32.5
UIVF	10	27.5 N	55.4 W	00	12	10	10 NM	02	1023.6	25.0	23.0	3	3	30	13	24.5
KODW	10	37.9 N	56.1 W	06	18	M 51	10 NM	02	1004.1	16.7	18.9	7	13	18	7	19.5
NIMI	10	35.0 N	73.4 W	09	32	18	5 NM			12.8	22.8	3	3	32	6	26
ICDP	10	40.2 N	51.8 W	12	21	50	.25 NM	62	1000.1	18.0	18.0	4	13	21	5	13
ATLANTIC	APR.															
KFDZ	10	39.0 N	52.3 W	12	19	50	5 NM	18	1004.7	16.1	15.6	5	10	21	13	26
DHES	10	45.4 N	52.6 W	15	18	M 52	2 NM		0971.0	4.2	1.2	8	13			
9VXX	10	46.2 N	53.0 W	18	27	M 56	1 NM	07	-0983.5	1.0	0.0	11	39			
CSDM	10	03.1 N	11.6 W	18	02	M 80	10 NM	02	1006.0		31.0					
ELIN	10	28.7 N	51.3 W	18	20	M 16	10 NM	02	1022.0	23.3	22.2	2	3	31	11	29.5
WVFN	10	46.8 N	48.7 W	18	18	M 68	.5 NM	21	0980.5	5.2	0.9	9	24.5			
RIGG	11	47.0 N	48.8 W	00	23	50	10 NM		0998.2	- 5.2		12	24.5			
UWEO	11	45.1 N	48.4 W	00	20	54	10 NM		1006.9	7.0	2.0	6	11.5			
TFWP	11	52.6 N	44.5 W	03	18	M 60	.25 NM	07	0974.5	5.0						
GOVP	11	39.8 N	53.5 W	12	29	M 30	10 NM	01	1022.7	13.8	16.7	6	11.5	28	7	32.5
GOZT	11	49.3 N	39.7 W	12	25	M 34	5 NM	02	1006.6	5.5	8.0	3	10	25	6	26
KFDZ	11	38.8 N	54.7 W	12	25	28	10 NM	02	1017.3	12.2	14.4	4	6.5	28	12	26
KFDZ	12	39.2 N	61.0 W	06	17	30	.25 NM	81	0990.0	18.9	16.1	XX	29.5			
SOCS	12	46.4 N	06.9 W	06	04	M 58	10 NM	02	1015.4	11.4	17.0					
FNZF	12	42.1 N	60.0 W	12	25	M 60	.5 NM		0973.5	8.0	1.0	3	6.5	20	6	19.5
GLGA	12	41.3 N	58.0 W	12	22	M 63	1 NM			12.8						
GOVP	12	39.0 N	57.5 W	12	25	M 55	5 NM		1003.7	17.5						
GVHY	12	44.1 N	58.5 W	12	15	M 56	.5 NM			1.8						
KFEY	12	41.2 N	60.3 W	12	29	58	2 NM	07	0999.5	6.0	18.3	6	10	27	8	19.5
OYIU	12	40.9 N	57.0 W	12	25	50			0996.0	17.0		6	23			
RIGG	12	44.0 N	59.6 W	12	03	M 55	10 NM	57	0992.7	- 0.9		5	10	02	11	16.5
CG2833	12	47.4 N	55.6 W	18	05	M 60	.5 NM	73	0980.7	- 0.5	2.5					
JEZB	12	46.3 N	55.0 W	18	10	M 50			0975.0	1.5		7	11.5	09	7	11.5
SGQJ	12	43.0 N	09.4 W	18	02	58	2 NM									
GOVP	13	39.1 N	58.3 W	00	26	M 18	10 NM	80	1014.9	12.0	16.8	4	6.5	26	8	26
WVFN	13	46.8 N	48.7 W	03	21	58	5 NM		0994.1	1.6	0.5	10	26			
RIGG	13	47.0 N	48.8 W	06	24	M 52	10 NM	07	0996.1	0.6	0.2	12	34.5			
SGQJ	13	44.5 N	06.0 W	06	07	58	10 NM	03	1012.2	10.9	12.0	15	10			
UIIV	13	43.5 N	09.4 W	18	05	48	10 NM	01	1017.9	15.2	16.0	8	19.5			
GOYF	14	44.2 N	09.0 W	00	05	M 39	10 NM	02	1016.1	10.2	14.0	4	19.5	03	6	26
GOVP	14	38.9 N	65.9 W	12	20	M 40	10 NM	71	1010.0	17.5	19.0	3	14.5	23	7	29.5
GPEE	15	53.4 N	31.5 W	18	25	M 09	10 NM	02	1024.6		6.5	1	1.5	26	9	32.5
JMVI	16	30.5 N	73.9 W	00	18	05	5 NM		1019.7	23.0	23.0	2	1.5	18	70	32.5
GPEO	17	49.9 N	04.0 W	12	06	M 54	5 NM	02	1023.5	7.9	9.4	4	6.5	06	5	6.5
UGNW	18	08.6 N	13.6 W	00	20	78	10 NM									
UIOC	18	08.8 N	18.5 W	00	30	64	> 25 NM		1010.7	25.0	26.0					
LGNP	19	48.8 N	06.5 W	12	07	M 50	10 NM	02	1022.4	10.4	11.7	7	8			
PCEU	20	20.7 N	58.3 W	06	09	78	> 25 NM		1015.5	24.6	25.0					
PJAE	20	38.9 N	72.0 W	06	01	50	> 25 NM									
NOST	20	45.4 N	34.2 W	18	30	14	10 NM	02	1024.0	15.8	11.7	2	5	30	8	26
USXF	22	58.3 N	30.7 W	00	23	M 47	.5 NM	74	1001.4	1.0	6.2	8	29.5			
EWVO	23	44.7 N	46.0 W	12	18	58	5 NM		1012.7	5.0						
WTGO	23	25.0 N	84.8 W	12	05	M 15	10 NM	02	1018.6	24.5	26.7	3	5	05	0	32.5
C7C	23	52.7 N	35.5 W	18	18	M 39	5 NM	80	1010.2	8.1	5.8	12	19.5	20	16	24.5
KPCV	23	33.0 N	71.2 W	18	35	25	10 NM	02	1024.0	16.1	18.3	4	10	36	44	36
CSDU	24	37.4 N	54.2 W	00	22	50	.25 NM	25	1004.0	18.5	18.0	XX	14.5			
KOBA	24	39.6 N	57.7 W	18	26	25	10 NM	02	1005.8	14.4	17.7	3	10	26	10	44
GUMF	25	58.5 N	05.7 W	06	23	M 25	5 NM	02	1033.0	10.1	7.2	4	6.5	27	9	24.5
SLDV	25	44.7 N	34.9 W	12	18	M 24	5 NM	50	1020.2	14.3		5	6.5	23	9	24.5
UKPF	26	22.5 N	66.1 W	06	06	48	10 NM	02	1010.0		20.0	7	13	02	1	0
H9KX	26	24.0 N	68.1 W	18	08	M 48				28.0						
GPEF	27	36.3 N	72.7 W	00	16	M 40	5 NM	15	1020.1	20.1	26.0	5	11.5	16	8	26
GUMF	27	59.4 N	05.2 W	12	23	M 30	5 NM	05	1025.3	10.6	8.7	5	13	24	8	24.5
GVIJ	27	44.6 N	38.7 W	12	09	M 20	5 NM		1027.1	13.9	14.2	2	5	09	26	55.5
DIHM	27	26.2 N	74.0 W	18	01	M 61	10 NM									
UYHW	28	21.5 N	50.4 W	12	05	M 64	10 NM	02	1016.7	24.0	26.0	7	8	07	12	10
CG2388	29	44.2 N	66.3 W	00	02	M 50	1 NM	64	1014.0							
UHMC	29	15.6 N	72.6 W	12	07	50		07								
NANTUC	30	40.5 N	69.5 W	03	19	M 48			1010.0	-10.0						
RIGG	30	44.0 N	59.4 W	03	16	M 22	2 NM		1003.0	1.5	2.0	54	36			
SLNA	30	57.3 N	16.7 W	06	28	M 72	2 NM	16	1016.3	9.0	15.0	6	18	29	8	19.5
	MAY															
TFPB	1	59.9 N	01.2 W	00	30	37	2 NM	25	0992.3	4.1						
UPJK	1	03.3 N	19.0 W	00	06	M 58	10 NM	02	1013.5	30.0						
GPIU	1	57.5 N	12.7 W	06	31	M 35	5 NM	23	1018.6	2.7	9.7	6	13	31	12	24.5
PHQZ	1	58.6 N	02.7 W	09	36	M 52	10 NM	02	1006.2	9.0						
GTOT	1	58.0 N	12.2 W	12	31	M 40	10 NM	02	1019.2	4.4	9.9	8	19.5	32	10	19.5

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C Air	Temperature °C Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
ATLANTIC	MAY															
FNIH	1	42.9 N	10.1 W	18	01	38	10 NM		1030.4	13.5	13.0	5	13	01	5	14.5
ULUV	1	58.0 N	09.9 W	18	31	31	10 NM		1020.6	3.5	7.4	9	11.5	33	18	19.5
WVFN	1	46.8 N	48.7 W	18	13	M 64	< 50 YD	45	1029.0	6.3	2.4	10	6.5			
C7L	2	56.0 N	18.2 W	00	24	M 42	2 NM	61	1007.5	8.3	10.3	8	13	25	10	14.5
UIIY	2	41.8 N	09.8 W	00	36	39	5 NM	02	1023.2	17.0	17.0	6	11.5	36	12	11.5
PBVC	2	54.7 N	15.5 W	03	23	M 39			1008.0	10.1	10.6	7	11.5	30	9	13
ESXW	2	53.8 N	15.6 W	06	27	43	5 NM		1008.3	9.8	11.8	13	18			
GTOT	2	57.8 N	09.8 W	06	14	M 42	1 NM	63	0996.8		9.6	4	6.5	27	8	10
DIHM	2	29.7 N	51.8 W	12	17	M 37	5 NM	60	1011.1	21.2	21.0	7	10			
GPIU	2	57.8 N	10.3 W	12	22	M 38	5 NM	25	0983.4	4.3	9.7	6	8	22	10	19.5
H9KX	2	33.7 N	45.3 W	12	09	M 37				19.5						
ULJV	2	59.0 N	16.7 W	12	04	39	10 NM		0997.5	9.5	9.0	9	13			
GWUM	2	55.3 N	16.1 W	15	34	M 36	2 NM	25	0998.6	4.2	10.5	7	11.5	27	10	18
GBTT	2	49.6 N	17.9 W	18	26	M 37	10 NM	02	1017.2	10.0	12.2	5	13	29	6	23
GYOH	2	56.3 N	00.0 W	18	19	M 35	10 NM	15	0991.0	7.8	7.0	5	8	20	7	10
OWVG	2	59.8 N	25.3 W	18	35	M 37	5 NM	83	1018.0							
SCAQ	2	50.2 N	02.0 W	18	23	M 50	10 NM	03	1013.3	12.0						
C7L	3	56.2 N	18.8 W	00	36	M 40	.25 NM	84	1007.2	1.1	10.1	9	13	35	9	13
EMAJ	3	48.1 N	45.4 W	00	11	M 68	200 YD	45	1037.2	4.0	4.0					
GPIU	3	57.0 N	08.5 W	00	35	M 50	2 NM	07	0983.2	4.1	9.7	6	13	32	12	26
GYAR	3	47.8 N	14.3 W	00	29	M 35	5 NM	02	1016.6	11.0	14.0	4	13	31	7	13
OWVG	3	58.9 N	22.9 W	00	34	M 37	2 NM	81	1015.0							
ULJV	3	59.6 N	22.0 W	00	34	M 48	2 NM		1021.9							
GUPM	3	50.5 N	00.7 W	03	24	M 37	5 NM	64	1004.4	10.4		6	19.5			
TFAR	3	56.5 N	08.3 W	03	32	M 44	.5 NM	81	0986.4	6.0						
GHLE	3	55.4 N	01.2 W	06	24	M 48	10 NM	02	0982.9	5.1	6.9	3	8	26	5	14.5
GOZT	3	50.7 N	12.4 W	06	30	M 35	10 NM		1006.6	6.8	11.5	4	6.5	30	6	16.5
KFCS	3	49.7 N	10.8 W	06	28	45	10 NM	07	1007.0	7.7	11.2	7	11.5	28	10	14.5
TFRB	3	59.8 N	07.3 W	06	03	52	.5 NM	84	0980.0	2.0						
VRKC	3	49.7 N	11.0 W	06	29	M 30	10 NM	16	1008.2	9.0	11.5	7	13	30	10	19.5
DBFM	3	51.6 N	18.6 W	09	32	M 40	1 NM	88	1015.3	4.6	10.9	10	16.5			
GNEW	3	49.6 N	06.0 W	12	29	M 37	5 NM	27	1006.8	9.6	12.0	6	10	30	7	8
H9KX	3	35.5 N	41.0 W	12	08	M 35				20.0						
KFCV	3	49.0 N	20.0 W	12	35	35	10 NM	02	1019.0	12.2	12.2	4	14.5	35	7	16.5
PHKS	3	53.9 N	03.4 W	12	24	37	5 NM		0996.5	8.6	8.8	7	10			
SCAQ	3	47.1 N	06.6 W	18	25	M 45	10 NM	03	1011.0	11.0						
UVEL	4	49.8 N	15.3 W	00	27	39	10 NM		1010.2	9.0	14.0	3	6.5	30	8	14.5
GWUM	4	55.2 N	05.8 W	03	33	M 36	10 NM	15	0998.2	5.7	8.2	5	8	32	7	6.5
FNBW	4	04.7 N	05.8 W	12	18	M 10	5 NM	25	1014.4	27.0	28.6			18	14	49
H9KX	4	37.1 N	36.4 W	12	09	M 45	2 NM	07		18.0						
EREA	4	50.0 N	17.3 W	18	34	M 39	5 NM	25	1020.7	6.9	11.8	10	14.5	01	16	24.5
FNWJ	4	37.6 N	12.1 W	18	01	M 40	10 NM	16	1020.1	16.0	18.0	3	8			
GVIJ	4	39.1 N	72.5 W	18	01	M 09	10 NM	03	1009.3	3.4	35.4	1	1.5	35	90	19.5
GZMC	4	47.4 N	17.2 W	18	34	M 30	10 NM	15	1020.8	10.0	12.4	5	14.5	33	8	26
IBPA	4	41.6 N	26.7 W	18	01	50		02	1026.0		16.0	5	10	35	6	11.5
OWVG	4	59.4 N	07.1 W	18	35	M 37	2 NM	10	1012.0	4.0						
OWVG	5	59.4 N	04.7 W	00	02	M 37	5 NM	25	1000.0	4.0						
GUXT	5	48.0 N	17.7 W	06	33	M 29	10 NM	82	1021.6	7.6	12.8	4	8	01	11	23
OWCJ	5	47.9 N	16.8 W	06	35	M 30	10 NM	02	1018.0	8.0	11.0	3	11.5	36	10	19.5
CGBV	5	46.9 N	57.5 W	12	05	75	2 NM									
H9KX	5	38.9 N	31.8 W	12	08	M 47	5 NM	00		18.0						
PDFO	5	35.7 N	08.9 W	12	35	36	10 NM		1018.8	15.0		4	6.5	35	10	10
SCAQ	5	38.0 N	10.5 W	12	17	M 41	10 NM	02	1020.0	19.0						
GXUT	5	49.0 N	14.3 W	18	35	M 22	10 NM	15	1021.8	10.1	12.4	3	6.5	34	10	19.5
UHAJ	5	52.8 N	34.9 W	18	21	12	10 NM		1029.8	12.0		22	21			
UTEW	5	47.9 N	11.6 W	18	01	39	10 NM		1018.3	11.5	10.0	6	6.5	35	12	16.5
YTTA	5	35.9 N	40.2 W	18	09	24	5 NM	02	1016.0	25.0		0	32.5			
GBBM	6	13.8 N	64.4 W	00	1	17	10 NM		1010.4	27.6	26.0	3	19.5	11	6	10
USLN	6	29.3 N	56.9 W	00	07	37	5 NM		1006.1	18.4	21.0					
GLGA	6	43.9 N	28.1 W	12	08	M 08	10 NM	01	1034.5	13.9	15.4	4	3	03	12	19.5
H9KX	6	40.9 N	27.6 W	12	08	M 37	5 NM	01	1003.1	16.0						
UPUM	6	32.1 N	48.5 W	12	12	M 37	2 NM		1012.3	16.1	23.0	6	11.5			
CGCT	6	52.2 N	55.2 W	18	23	35	2 NM		1011.4	0.9		3	1.5			
DIER	6	36.8 N	12.2 W	18	02	M 30	10 NM	02	1020.5	14.0	14.4	5	10	36	9	19.5
PGEF	6	39.0 N	65.4 W	18	03	37	10 NM		1013.9	14.4	21.0	4	5	04	8	11.5
WPGO	6	32.3 N	70.5 W	18	01	35	10 NM	02	1017.0	22.2	22.2	7	6.5	02	6	6.5
CSDU	7	39.2 N	63.0 W	00	04	35	10 NM	02	1012.0	12.5	22.0	XX	10			
GXEH	7	36.5 N	02.6 W	00	06	37	10 NM		1016.8	16.5	16.9	6	16.5	06	6	10
FNFD	7	35.9 N	00.2 W	03	04	M 37	10 NM	21	1012.0	16.5		8	10			
FNHR	7	34.1 N	15.1 W	06	05	40	10 NM	03	1020.5	16.0		6	10	01	7	10
FNUB	7	00.3 N	04.9 E	06	02	M 65		02	1014.0			5	6.5	17	10	5
GVIN	7	36.1 N	00.0 W	12	03	M 46	2 NM	60	1011.3	14.5	16.0	7	29.5			
HZOO	7	36.5 N	13.5 W	12	03	M 40	10 NM	03	1021.7	15.0	16.0	5	8	02	6	11.5
KTHX	7	36.5 N	00.5 W	12	04	35	2 NM	51	1013.5	14.8	17.2	7	8	05	7	14.5
ONLA	7	36.6 N	61.5 W	12	11	M 18	10 NM	06	1005.0	19.0	20.8	3	6.5	04	8	24.5
PCOH	7	40.6 N	39.9 W	12	13	M 36	5 NM		1022.0	16.4	16.4	6	13	15	12	16.5
DVHC	7	25.0 N	71.0 W	18	36	M 08	10 NM	02		24.6	25.5	2	3	01	9	19.5
FNEH	7	14.8 N	17.8 W	18	36	24	5 NM		1015.0	21.6	21.4	7	21	34	7	3
LGNP	7	38.0 N	52.8 W	18	06	M 52	10 NM	81	1002.2	18.6	19.5	10	6.5	11	12	10
UHAJ	8	58.2 N	20.2 W	00	20	43	5 NM		1015.1	9.0	4.1	3	5	00	0	0

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C Air	Temperature °C Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
ATLANTIC	MAY															
PHQZ	8	58.8 N	00.5 W	06	36	M 35	10 NM	02	1019.3	12.2						
PJPY	8	14.5 N	72.6 W	06	02	53	10 NM	32	1013.4	27.0	27.0					
UHMC	8	35.5 N	12.6 W	06	02	47	10 NM		1023.7	15.5	17.0	8	13			
ATLI	8	38.3 N	59.8 W	09	35	35	10 NM	15	1002.5	18.5	19.0					
FNHV	8	36.2 N	54.1 W	12	19	M 36	5 NM	81	0999.4	18.7		6	16.5			
GTOZ	8	24.7 N	59.5 W	12	26	M 17	10 NM	15	1017.0	24.5	24.6	3	5	28	8	41
SODX	8	57.8 N	18.8 W	12	22	39			1005.5	12.0						
VRLK	8	37.1 N	61.6 W	12	35	37	5 NM		1005.1	18.0		3	6.5	01	7	11.5
GVHC	8	30.0 N	68.7 W	18	28	M 09	10 NM	02	1018.4	21.5	20.6	1	1.5	36	9	19.5
GXEH	8	38.2 N	09.5 W	18	35	37	10 NM		1017.0	15.2		5	16.5	36	8	14.5
KFGJ	8	46.8 N	33.6 W	18	20	10	10 NM	02	1021.0	17.8	15.0	3	5	20	20	54
VPLI	8	40.6 N	58.7 W	18	03	M 35	5 NM	10	0996.8	16.0		5	10	05	9	16.5
WFQB	8	41.4 N	58.4 W	18	05	35	.5 NM		1000.5	13.3	17.8	5	13	05	6	13
4XSJ	9	36.1 N	59.1 W	00	30	M 40	2 NM	58	1001.0	17.0	19.0	3	11.5			
SQSV	9	57.0 N	23.0 W	00	25	M 39	10 NM	25	1001.5	6.4						
WSNH	9	41.3 N	55.0 W	00	09	M 38	5 NM	02	0999.0	17.5	17.0	6	13	18	9	13
YTTA	9	34.7 N	60.9 W	00	32	40	5 NM	01	1002.0	19.0	19.0	8	10	36	10	10
GXIH	9	39.7 N	57.7 W	06	36	M 34	5 NM		0995.6	16.8	15.0	6	11.5	09	6	19.5
WCJS	9	39.8 N	49.0 W	06	19	35	1 NM	60	1003.0	18.4	17.7	5	8	19	6	13
GXEH	9	40.3 N	09.8 W	12	01	37	> 25 NM		1018.5	15.1		6	16.5	01	8	16.5
GOQH	9	41.2 N	52.0 W	18	22	M 17	2 NM	18	0993.8	17.2	17.4	5	6.5	18	8	23
GVHC	9	35.2 N	65.9 W	18	26	M 10	10 NM	03	1013.4	21.6	20.8	1	1.5	03	10	26
GXER	9	41.0 N	09.6 W	18	36	35	10 NM		1017.7	14.2	15.6	5	11.5			
KVaH	9	17.9 N	78.2 W	18	30	50	5 NM		1015.0	33.1	30.0			09	6	1.5
SODX	9	56.0 N	28.1 W	18	29	M 54	5 NM	25	1009.0	6.9	11.0					
UPOP	9	12.5 N	73.2 W	18	07	45	5 NM		1016.9	30.0	30.0	3	5	04	8	6.5
OYKZ	10	42.0 N	53.1 W	00	23	35	.5 NM	63	0994.5	11.7		XX	18	--	XX	70
WVFN	10	46.8 N	48.7 W	00	11	M 38	< 50 YD	51	1007.6	7.8	3.7					
FNZE	10	41.7 N	53.7 W	06	27	40	10 NM		1002.0	14.8	16.0	5	13			
GOQH	10	43.1 N	54.3 W	06	27	M 30	5 NM	02	0996.2	6.1	5.2	5	11.5	26	10	19.5
WCJS	10	40.0 N	57.8 W	06	28	25	10 NM	02	1004.5	15.6	17.8	3	19.5	28	5	8
RIGG	10	47.0 N	48.8 W	09	14	M 37	200 YD	55	1004.7	7.7	4.2	9	10			
DEBS	10	49.4 N	11.4 W	12	15	M 40	2 NM	62	1004.8	11.3	11.6	5	11.5	15	10	13
GRUJ	10	44.3 N	53.1 W	12	22	M 24	2 NM	60	0996.4	5.3	5.6	5	11.5	23	10	19.5
H9KX	10	49.3 N	05.0 W	12	17	M 39	5 NM	00		13.0						
LEQY	10	33.7 N	34.5 W	12	27	M 41	10 NM	02	1026.0							
ONLA	10	41.2 N	44.8 W	12	34	M 47	5 NM	02	1014.6	19.6						
LFAE	10	47.0 N	48.8 W	18	15	M 35	5 NM	10	1006.3	8.8	4.3	5	6.5	18	9	8
GUZJ	11	41.8 N	68.2 W	00	01	M 36	5 NM		1010.0							
FNCI	11	43.7 N	09.5 W	06	19	M 36	2 NM	59	1004.6	13.7	14.0	6	13			
GXER	11	45.2 N	07.8 W	06	18	M 38	5 NM	50	1007.5	11.5	12.8	10	11.5	22	10	16.5
PJYG	11	33.5 N	65.8 W	06	24	35	10 NM	13	1005.2	20.0	19.2	3	5	24	6	10
UKPE	11	42.6 N	10.5 W	06	21	M 39	5 NM	02			17.0	11	21			
USKE	11	43.6 N	08.9 W	06	20	M 35	2 NM	61	1006.6	12.0	14.0	5	8	33	8	8
NFFS	11	38.8 N	70.7 W	09	35	38	5 NM	02	1009.5	20.0	16.1	5	5	32	5	18
4XSJ	11	35.4 N	72.7 W	12	34	M 36	5 NM	01	1013.0	16.6	24.0	9	8	34	9	8
9VXX	11	47.0 N	18.6 W	12	30	35	5 NM		0998.5	11.5	14.0	10	16.5			
KFEJ	11	49.8 N	12.2 W	12	10	M 35				11.7						
KFGJ	11	49.7 N	07.2 W	12	12	35.	5 NM	81	1011.2	11.6	13.3	4	10	11	4	10
OEW	11	49.5 N	13.4 W	12	12	M 03	5 NM	03	1002.0	11.1	12.8	4	10	06	6	19.5
OYKZ	11	40.9 N	67.2 W	12	36	37	2 NM	62	1009.5	7.5	15.0	XX	13	--	XX	70
SGBO	11	46.0 N	07.2 W	12	17	M 56	5 NM			13.2						
UBQP	11	35.4 N	71.0 W	12	33	M 35	10 NM	02	1011.2	16.2	18.5	5	10	33	10	11.5
SLCI	11	42.5 N	10.4 W	18	20	27	5 NM	15	1013.8	15.0	17.0	5	13	29	9	19.5
FNIH	11	43.7 N	09.2 W	18	20	M 35	5 NM	01	1012.7	14.0		4	6.5	22	8	19.5
GRZU	11	47.3 N	21.6 W	18	36	M 45	10 NM			12.8						
GUEO	11	21.2 N	75.2 W	18	01	M 65	> 25 NM	01	1014.4	27.0						
GYAH	11	50.7 N	09.1 W	18	08	M 37	2 NM	63	1010.7	10.5	11.0	6	16.5	08	6	14.5
KEMP	11	48.7 N	18.5 W	18	04	33	10 NM		1003.5	14.0	11.0	5	18	04	7	21
WLBY	11	39.4 N	70.3 W	18	02	35	10 NM	02	1013.9	13.4	14.5	4	6.5	04	8	5
ONEI	12	40.6 N	65.5 W	00	02	M 40	5 NM		1004.5	10.0	10.0	4	8	03	8	16.5
WNDJ	12	37.3 N	61.9 W	00	18	36	5 NM	61	1003.0	20.0	23.3	3	10			
GBZU	12	48.3 N	18.8 W	06	03	M 35	10 NM	07	0999.6	11.5	13.0	2	10	36	10	26
KEMP	12	49.2 N	13.5 W	06	13	17	10 NM		1004.0	14.0	11.0	5	19.5	09	7	11.5
DIME	12	51.8 N	26.0 W	09	02	20	10 NM		1020.0	10.5	10.6	2	3	09	10	39
FNFO	12	48.6 N	13.6 W	12	12	M 36	5 NM	25	1002.2	12.1	13.2	5	19.5			
FNZF	12	45.1 N	54.5 W	12	09	M 39	50 YD	45	1018.6	4.6	4.2	2	8			
SODX	12	48.2 N	46.5 W	12	02	M 80	.25 NM									
USLN	12	46.3 N	12.6 W	12	22	29	10 NM		1004.6	13.8	12.0	10	19.5			
RIGG	12	47.5 N	48.2 W	18	31	M 09	200 YD	47	1024.5	3.8	2.4			31	10	54
ONMC	13	07.0 N	12.9 W	06	02	M 68			1010.0		26.5			16	6	1.5
SLPT	13	57.8 N	06.8 W	12	33	37	5 NM		1028.0	7.8		5	5	12	5	5
WNOW	13	21.5 N	67.1 W	12	01	M 10		61	1015.0	21.7	26.1	6	3	01	7	19.5
UTNE	13	50.8 N	11.3 W	18	15	35	5 NM	10	1015.9	13.0	13.0	4	6.5			
GOFM	14	17.8 N	75.5 W	00	01	M 48	> 25 NM	02	1009.8	27.0	27.4	4	6.5	06	6	8
CG2613	14	44.4 N	63.6 W	06	36	M 35	5 NM	80	1018.0							
FNIH	14	35.9 N	05.9 W	06	09	41	5 NM	02	1019.3	16.0	17.0					
KRHI	14	53.5 N	19.5 W	12	20	M 40	5 NM	25	1007.0	11.0	11.3	4	10	20	6	13
ONMC	14	14.4 N	17.8 W	12	02	39			1012.2		20.5			36	6	3
GHZW	15	48.5 N	63.9 W	12	03	36	2 NM		1025.0							

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C Air	Temperature °C Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
ATLANTIC	MAY															
SMAO	15	22.3 N	22.9 W	15	04	M 43										
PHNQ	15	57.0 N	00.8 W	15	15	M 35	5 NM	02	1018.9	7.5						
USBZ	15	46.3 N	42.3 W	18	04	39	10 NM	02	1021.5	13.0	10.0	6	6.5			
6ZYP	16	15.9 N	18.1 W	06	36	37	5 NM		1010.0	22.0	22.0	8	6.5	36	9	6.5
ESRF	16	16.2 N	20.3 W	06	01	37	5 NM		1014.6	20.5	22.0	7	8			
JZWL	16	40.0 N	65.4 W	12	34	M 39	2 NM	05	1012.6	13.8	18.9	8	11.5	02	8	13
VCTK	17	49.5 N	67.1 W	06	06	71	1 NM									
SMAO	17	14.6 N	26.4 W	09	04	M 61				24.0						
PHSM	17	47.2 N	07.2 W	18	14	M 05	5 NM	61	1016.7	13.4	14.0	0	0	29	8	21
ONMC	18	33.9 N	13.6 W	06	01	80			1019.0		17.0			36	6	3
ELBM9	18	19.6 N	82.2 W	12	05	M 23	10 NM	01		25.0	26.0	4	5	18	5	19.5
FNFO	18	40.6 N	57.4 W	12	33	M 36	5 NM	25	1010.5	9.4	19.5	5	14.5			
GVHY	18	44.1 N	58.5 W	18	31	40	10 NM		1012.0	2.8	2.2	6	13			
WSVB	18	41.6 N	59.9 W	18	31	M 46	5 NM	02	1004.0	10.5						
3FFN	19	25.0 N	60.9 W	00	04	M 37	5 NM	64	1017.4	20.8	25.0					
GBXP	19	45.6 N	15.5 W	00	20	M 37	2 NM	51		14.0	13.0	2	11.5			
GVHY	19	44.1 N	58.5 W	03	33	42	10 NM		1014.8	2.4	1.8	8	14.5			
PCVH	19	43.9 N	57.4 W	06	31	37	5 NM		1009.0	5.0	5.7					
PGDK	19	37.9 N	09.6 W	06	34	M 35	10 NM	01	1021.0	15.5	16.1	4	5	32	6	5
SJRP	19	45.5 N	16.4 W	06	23	M 35			1011.0	16.0		5	13	23	12	19.5
SMAO	19	05.3 N	29.5 W	09	04	M 44		03	1008.3	27.3	27.0	6	8	04	6	8
EVPW	19	44.9 N	52.6 W	12	35	M 37	.5 NM	62	1006.3	2.0	4.8	11	14.5			
PHPI	19	38.5 N	56.0 W	12	33	M 40	5 NM	15	1019.0							
EPEA	19	45.9 N	45.0 W	18	25	M 37	1 NM	80	0996.5	5.9	7.6	10	18	25	13	21
ICDP	19	41.4 N	48.1 W	18	27	40	2 NM	96	1005.0	12.0	12.0	8	16.5	28	3	6.5
LFAE	19	47.5 N	48.2 W	18	33	M 35	5 NM	01	1002.8	4.2	3.0	7	10			
YTFF	19	35.6 N	10.5 W	18	11	80			1020.0			0	6.5			
ICDP	20	41.5 N	49.7 W	00	31	40	5 NM	96	1017.0	10.0	8.0	8	16.5	28	3	6.5
DILL	20	43.0 N	40.0 W	09	30	M 37	2 NM			9.5						
FNZE	20	45.1 N	39.6 W	12	28	M 36	10 NM		1008.6	10.4						
GOOF	20	49.9 N	27.3 W	12	16	M 12	1 NM	28	1001.1	13.8	13.0	3	3	20	10	23
JJTK	20	45.3 N	42.7 W	12	29	M 38	5 NM	02	1012.0	8.0	15.0	7	10	29	7	14.5
KFDZ	20	38.0 N	42.2 W	12	30	27	10 NM	01	1021.3	15.6	17.2	3	6.5	28	9	23
WSNH	20	47.1 N	34.7 W	12	24	M 40	5 NM	16	0997.5	14.0	13.0	5	13	20	8	10
DHOW	20	45.8 N	38.4 W	15	28	M 38	5 NM			10.6						
GBDT	20	49.9 N	35.9 W	18	27	M 42	5 NM	60	1001.7	10.5	13.0	4	19.5	25	7	16.5
GVHY	20	44.1 N	58.5 W	18	20	M 38			1011.5	7.8	2.1	7	13			
KFEJ	20	47.6 N	34.4 W	18	28	M 35	5 NM	25	1001.2	11.7	12.8	5	16.5	26	11	19.5
KFGJ	20	46.4 N	41.2 W	18	28	35	5 NM	02	1009.2	11.5	15.0	8	10	28	6	10
VCSZ	20	45.7 N	58.6 W	18	22	M 44	200 YD	47	1005.0							
VPFZ	20	49.8 N	31.7 W	18	20	M 37	5 NM	81	0993.9	12.0	10.0	5	6.5	20	7	16.5
NJZP	21	50.8 N	30.7 W	00	23	40	10 NM	02	0993.0	10.5	12.2	5	6.5	25	7	14.5
USNG	21	45.6 N	31.9 W	00	27	33	5 NM	03	1013.0	13.0	13.0	14	24.5			
GVHY	21	44.1 N	58.5 W	03	20	M 35	< 50 YD	63	1009.4	8.0	2.0	9	13			
VRCO	21	48.6 N	38.0 W	06	28	M 37	5 NM	02	1012.4	9.5	11.0	5	5	27	8	10
WSNH	21	48.6 N	26.8 W	06	24	M 35	2 NM	16	1007.2	12.0	12.0	5	8	22	8	11.5
DHOW	21	46.4 N	32.9 W	09	28	M 33	5 NM	02	1018.7	11.5	13.6	8	14.5	29	11	21
FPBH	21	45.2 N	27.8 W	09	01	38	5 NM		1018.9		14.6	5	13			
FNUE	21	46.6 N	27.9 W	12	26	M 40	5 NM	01	1021.0	13.0	11.0	6	16.5	27	10	19.5
PCLJ	21	35.2 N	15.8 W	12	01	58	10 NM		1026.5	17.5	18.3	3	6.5	03	5	6.5
WVFN	21	46.8 N	48.7 W	12	20	41	.5 NM		1006.8	8.2	3.4	7	14.5			
YTYJ	21	47.7 N	30.1 W	12	27	40			1015.0	13.5	14.0	8	10	00	0	0
GBDT	21	47.3 N	40.1 W	18	24	M 44	2 NM			13.2						
JJTK	21	43.4 N	53.2 W	18	22	M 35	.25 NM			11.5						
KFEJ	21	45.7 N	42.4 W	18	24	M 33			1017.5	15.0	13.3	4	11.5	25	8	21
KSLB	21	40.9 N	60.1 W	18	25	36	2 NM	25	1016.2	20.0	15.0	5	5	25	8	10
UEBT	22	31.8 N	12.8 W	00	02	37	10 NM	02	1018.0	18.9	19.0					
USNG	22	48.7 N	26.7 W	00	25	25	5 NM	02	1015.2	12.0	12.0	10	21			
FBPH	22	47.8 N	28.6 W	03	26	35	5 NM		1014.9	13.2	12.5	5	13			
WJBJ	22	45.2 N	26.2 W	11	25	40	5 NM	01	1023.2	15.6	12.2	4	13	26	10	16.5
IBKL	22	37.2 N	11.2 W	12	02	M 35	5 NM	03	1020.5	18.0	18.0	5	8	00	0	0
NJZP	22	47.4 N	36.7 W	12	24	35	2 NM	10	1012.0	15.4	12.2	4	6.5	25	5	11.5
VOBJ	22	50.6 N	53.5 W	12	28	36	5 NM		1004.0							
VRKY	22	45.5 N	41.5 W	12	01	M 52	1 NM		1016.7		14.0					
GXEW	22	49.0 N	41.7 W	18	27	M 26	10 NM	02	1013.8	7.0	13.0	2	6.5	26	7	19.5
UPWW	22	27.7 N	16.2 W	18	02	M 39	10 NM	02	1014.9	20.6	20.2	12	32.5			
GOOR	23	46.6 N	45.8 W	00	22	M 40	10 NM	01	1018.1	5.1	6.0	4	11.5	23	9	13
GSHF	23	39.1 N	64.8 W	00	07	M 37	10 NM	15	1026.0							
VOBJ	23	51.7 N	52.0 W	00	26	M 39	2 NM	10								
VRKY	23	45.9 N	44.9 W	00	26	M 50	10 NM			7.0						
TSLM	23	44.5 N	08.6 W	03	25	16	> 25 NM		1017.5	16.0		22	23	25	8	6.5
DEFG	23	26.2 N	20.5 W	06	02	M 35	5 NM	18	1016.2	19.8	20.8	4	10	[illegible]	5	11.5
FNTP	23	32.8 N	12.8 W	12	01	30	10 NM		1017.2	19.4	18.0	2	10	01	3	19.5
GRUW	23	33.5 N	49.9 W	12	10	73	10 NM			20.9						
WOOP	23	39.9 N	50.7 W	12	03	M 33	5 NM	81	1031.0	13.3	16.7	6	32.5	04	8	32.5
EWAK	23	33.1 N	13.4 W	18	01	37	10 NM		1019.0	19.0	19.0	6	8			
GRHQ	23	32.2 N	60.3 W	18	29	70		09								
KYZL	23	35.4 N	10.6 W	18	36	M 35	5 NM	02	1020.2	19.0						
RIGG	23	47.5 N	48.2 W	18	30	38	5 NM		1021.1	1.7	1.7	7	14.5			
UQJW	23	47.1 N	44.9 W	18	29	M 31	10 NM	03	1020.6	8.0	7.0	5	6.5	31	16	19.5

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C Air	Temperature °C Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
ATLANTIC	MAY															
UUFI	23	40.1 N	10.8 W	18	10	25	10 NM		1023.8	17.0	15.0	4	3	30	8	19.5
UUOV	23	48.1 N	46.7 W	18	27	M 70	5 NM	18	1020.3	1.0						
GUOT	24	40.8 N	72.2 W	00	06	M 37	.25 NM	63	1023.0							
UJRO	24	31.2 N	11.0 W	00	32	M 43			1018.0	26.0		2	0			
UUFI	24	39.1 N	11.2 W	00	35	19	10 NM		1023.2	16.0	17.0	4	5	30	8	19.5
UYZL	24	34.7 N	12.5 W	00	36	M 35	10 NM	02	1020.2	18.0	19.0	6	5	33	10	10
VOBJ	24	51.5 N	50.5 W	00	32	M 35	5 NM	02	1018.0							
GXXW	24	49.5 N	03.8 W	03	26	M 47	10 NM	02	1013.6	12.0	11.8	4	8	26	6	13
TFSV	24	46.3 N	35.2 W	09	29	M 37	5 NM		1005.1	8.5						
ESGJ	24	47.7 N	38.8 W	12	27	45	10 NM		1012.2	14.5	12.0	4	5	28	12	23
GCFE	24	46.7 N	32.2 W	12	28	M 37	10 NM	01								
GOVG	24	41.0 N	10.3 W	12	02	M 48										
FBPH	24	47.8 N	28.6 W	15	27	M 35	5 NM	02	1008.8	10.3	12.4	6	13			
UYBB	24	52.1 N	30.1 W	18	33	12	5 NM		1005.9	8.0	15.0	8	19.5			
NJJC	25	36.0 N	05.9 W	03	08	M 35	5 NM		1010.5	19.4	17.2					
UUFI	25	33.8 N	13.2 W	06	36	21	10 NM		1017.6	18.0	18.0	6	6.5	01	8	19.5
UYBB	25	50.9 N	33.4 W	06	32	25	5 NM		1007.4	5.8	14.0	10	19.5			
OLBB	25	47.3 N	31.3 W	12	28	M 37	10 NM	25	1015.0	12.0	13.0	9	16.5	28	10	16.5
NPDO	26	35.4 N	74.9 W	00	20	M 45	10 NM	83	1013.0	23.0						
UYBB	26	49.1 N	39.7 W	06	25	23	5 NM		1013.9	8.2	15.0	10	19.5			
DSJO	26	48.6 N	38.0 W	12	26	M 38	10 NM	03	1010.0	15.5	12.0	8	11.5	26	6	8
EREA	26	43.8 N	42.9 W	12	15	M 35	2 NM	61	1011.8	14.9	14.1	9	14.5			
ESGK	26	48.8 N	42.7 W	12	31	45	10 NM		1012.3	7.5	12.0	10	11.5			
GCFE	26	43.4 N	43.3 W	12	18	M 37	2 NM	63	1010.4	15.5	16.8	4	8	19	5	8
PFNO	26	21.3 N	18.0 W	12	01	27	5 NM		1014.2	19.1	16.8	5	19.5	01	10	16.5
EIOO	26	52.9 N	09.9 W	18	27	11	> 25 NM		1022.5	18.0		1	1.5	27	1	19.5
IBKL	26	41.6 N	48.3 W	18	23	M 45			1012.0	20.0	10.0	4	11.5	00	0	0
JDLC	26	13.7 N	80.5 W	18	02	M 70	10 NM									
EVKA	27	43.0 N	36.8 W	00	23	M 35	5 NM	21	1011.9	17.0	14.0	11	19.5			
IBKL	27	42.0 N	50.7 W	00	23	M 44			1012.0	13.0	10.0	4	11.5	00	0	0
PHPI	27	44.6 N	36.2 W	00	15	M 40	1 NM	81	1010.0							
OYOR	27	59.0 N	45.6 W	06	06	M 37	2 NM	74	1001.7	2.2	3.0	8	13			
UVNG	27	39.7 N	32.4 W	06	21	M 35	5 NM		1025.5	18.2	18.0					
FSJO	27	45.9 N	43.3 W	12	27	M 42	2 NM	10	0998.0	15.0		6	10	27	6	10
LGNP	27	39.2 N	31.7 W	12	22	M 45	> 25 NM		1024.7	19.4	18.8	7	6.5			
SGGP	27	42.7 N	09.6 W	12	36	47	> 25 NM		1024.1	14.4						
4XMU	27	39.6 N	09.7 W	18	33	M 25	10 NM	00	1020.0	16.5	16.0	4	13	36	5	19.5
ONBI	27	48.5 N	30.2 W	18	23	M 40	10 NM	02	1003.0	14.1	13.0	7	19.5	23	7	19.5
OXYL	27	58.6 N	46.6 W	18	06	M 52	2 NM	81	0997.8	2.7	2.4	9	29.5			
SOAQ	27	37.7 N	09.7 W	18	34	M 58	10 NM	02	1019.0	18.0						
VOBJ	27	48.7 N	52.0 W	18	32	35	10 NM		1007.0							
ENVK	28	33.9 N	44.7 W	00	14	64	10 NM		1023.1	20.0	20.0					
EVPW	28	48.0 N	44.8 W	00	28	41	2 NM		1005.3	5.0	4.3	10	14.5			
SOAQ	28	38.8 N	09.8 W	00	07	M 68	10 NM	02	1019.0	17.0						
UEZT	28	18.1 N	19.3 W	00	01	M 39	10 NM		1016.5	20.0						
UJEH	28	37.2 N	11.9 W	00	03	35	10 NM		1026.0							
WVFN	28	46.8 N	48.7 W	03	26	73	10 NM		1012.4	4.6	3.4	7	10			
4XMU	28	40.7 N	09.7 W	06	36	M 22	10 NM	00	1019.0	15.0	16.0	5	16.5	36	5	19.5
ESGK	28	47.7 N	46.2 W	06	27	37	5 NM		1002.6	5.0	9.0					
OXYL	28	58.3 N	45.2 W	06	04	M 52	2 NM	25	0998.4	3.3	3.2					
FNIB	28	46.6 N	45.2 W	09	29	M 39	5 NM	03	1008.0	4.2	5.2	12	13	27	10	19.5
4XII	28	41.6 N	43.9 W	12	01	48		02	1016.0			5	5	35	5	5
KHLX	28	48.4 N	21.4 W	12	19	16	5 NM	28	1015.0	13.3	11.7	4	5	20	9	19.5
PCVH	28	48.9 N	42.5 W	12	28	44	5 NM		0997.0	9.0	10.8	8	13	24	9	19.5
VRKC	28	49.0 N	43.9 W	12	27	M 35	5 NM	60	0996.5	4.0	8.3	5	13	27	10	16.5
RIGG	28	47.5 N	48.2 W	15	29	42	5 NM		1011.8	2.0	1.9	7	14.5			
SLWG	28	17.6 N	73.0 W	18	13	22	10 NM	02		29.4	27.8	10	3	10	10	19.5
OAKE	28	47.9 N	47.4 W	18	29	M 44	5 NM	83	1008.5	2.5	2.5	6	13	29	13	26
EMAJ	28	48.1 N	45.3 W	18	28	M 35	1 NM	51	1007.3	2.0		8	16.5	28	10	16.5
EMKF	28	23.4 N	16.5 W	18	02	60	10 NM		1016.2	19.0						
GXIG	28	37.8 N	11.7 W	18	35	35	> 25 NM		1019.1	15.7	16.6	7	18			
KFEM	28	50.4 N	40.2 W	18	26	37	2 NM	60	0988.1	8.3	9.4	9	8	25	10	19.5
ONBI	28	46.6 N	38.8 W	18	24	M 48	10 NM			8.5						
ONMZ	28	27.7 N	16.4 W	18	35	08	10 NM		1016.3	20.6	19.2	5	6.5	02	8	19.5
OWVG	28	58.2 N	43.0 W	18	02	M 37	1 NM		1001.0							
USHV	28	46.5 N	39.9 W	18	27	M 41	5 NM	02	1005.3	14.8	13.1	12	16.5			
UUFI	28	28.4 N	11.2 W	18	02	41	5 NM		1017.2	20.0	20.0			02	9	19.5
ZCKE	28	50.5 N	33.6 W	18	23	M 45	5 NM		0991.3	10.4	12.8	4	10	24	7	19.5
KFEM	29	49.7 N	41.5 W	00	27	36	2 NM	62	0995.5	7.8	12.8	6	8	24	8	18
KFEZ	29	44.7 N	42.0 W	00	29	35	5 NM	02	1013.0	8.9	15.5	3	10	26	6	13
ONAL	29	49.5 N	48.3 W	00	30	M 33	5 NM	03	1013.0	2.0	3.2	6	11.5	34	13	19.5
OWVG	29	57.9 N	40.8 W	00	01	M 37	2 NM		0998.0							
UJMG	29	46.2 N	43.3 W	00	28	41	10 NM		1012.3	2.4	12.0	10	13			
USPV	29	46.5 N	39.6 W	00	27	39	5 NM		1007.4	13.0	13.0	12	16.5			
EWMO	29	21.6 N	17.5 W	06	01	M 47	10 NM		1014.6	18.0	19.0	9	10			
GOVG	29	46.8 N	41.1 W	06	26	M 40	10 NM	02	1009.4	6.5		5	6.5	26	10	24.5
ONMZ	29	29.3 N	15.6 W	06	01	17	10 NM		1017.7	18.4	18.6	5	6.5	02	8	19.5
ZCKE	29	50.3 N	35.9 W	06	29	M 36	10 NM	82	0995.2	8.0	12.2	3	8	26	9	23
CTC	29	52.7 N	35.5 W	09	29	M 39	5 NM	15	0989.0	6.1	6.8	10	18	28	14	23
ONND	29	10.0 N	28.4 W	12	02	53		03	1015.5			3	5	36	5	3

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C. Air	Temperature °C. Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
ATLANTIC	MAY															
SLNA	29	53.0 N	29.5 W	12	23	M 37	2 NM	21	0987.0	9.3	11.0	6	13	23	10	23
UVNG	29	47.7 N	15.5 W	12	20	M 35	10 NM	00	1023.5	15.0	15.0	5	6.5	20	7	6.5
EREA	29	44.6 N	42.7 W	18	30	M 21	5 NM	03	1019.2	9.0	13.4	5	6.5	31	15	21
GJVE	29	56.8 N	08.0 W	18	20	36	10 NM	02	1020.8	12.2	10.8	4	8	22	6	16.5
SOAQ	29	46.5 N	06.9 W	18	03	M 35	10 NM	02	1019.0	17.0						
SQDX	29	58.3 N	11.2 W	18	17	M 35	5 NM	61	1011.0	11.0						
ZMNA	29	38.9 N	42.7 W	18	32	M 13	> 25 NM	02		15.4	17.5	2	5	01	11	24.5
JEQF	30	50.6 N	39.5 W	00	31	M 39			1019.0	7.0	10.0	5	8	30	8	10
C7L	30	57.1 N	19.7 W	03	20	M 35	5 NM	25	1003.3	10.1	11.2	6	11.5	22	8	13
GUMF	30	59.0 N	07.0 W	06	21	M 36	10 NM	02	1018.3	12.9	10.0	6	18	22	7	16.5
URVZ	30	04.0 N	00.2 W	06	21	M 41	2 NM	53	1013.9			7	8			
OVQW	30	59.6 N	39.1 W	12	36	24			1012.2	3.1	4.4	12	26			
DIUT	30	32.9 N	31.4 W	18	23	10	10 NM		1023.0	28.0	21.0	10	3	23	10	36
SOAC	30	50.6 N	01.1 W	18	07	M 37			1010.0	16.0						
UHPO	30	58.6 N	06.9 W	18	01	M 50		02	1021.0		11.0	6	8			
UNXZ	31	47.2 N	06.3 W	00	11	M 04	2 NM	10	1022.3	10.5	14.0	0	0	32	10	32.5
PDGL	31	46.2 N	16.3 W	06	12	42	10 NM	15	1015.0	13.0						
JGED	31	44.9 N	32.6 W	12	32	M 25	2 NM	16	1014.5	15.5	14.0	7	16.5	33	10	24.5
LGNP	31	35.1 N	61.8 W	12	25	54	5 NM		1013.4	24.8	25.1	7	8	22	8	5
SIQT	31	43.7 N	41.5 W	12	36	35	10 NM		1024.2	10.8		4	3	33	8	6.5
UHPO	31	57.3 N	12.8 W	12	01	M 54			1013.3		11.0	6	8			
SLCI	31	45.7 N	28.7 W	18	34	47	2 NM	16	1008.3	10.5	15.0	6	19.5			
OVQW	31	59.8 N	47.6 W	18	12	37	1 NM		1001.2	1.8	0.8	9	19.5			
OXON	31	44.9 N	24.6 W	18	23	M 35	5 NM	80	1000.5	15.0	15.0	6	13			
UGRP	31	44.3 N	28.5 W	18	29	M 37	10 NM	01	1012.5	18.0	16.0	12	16.5			
GR. LAKES	MAY															
VDMV	5	47.2 N	85.7 W	12	01	M 41	5 NM									
VCQL	13	42.5 N	79.8 W	03	20	M 66	2 NM	05								
VYFL	22	47.1 N	85.5 W	18	30	M 54	10 NM									
	JUNE															
SLCI	1	45.4 N	30.3 W	00	32	77	5 NM	16	1020.4	11.5		6	13			
C7R	1	46.7 N	16.1 W	00	17	16	10 NM		1015.4	14.4	14.5	6	5	28	63	54
OVCW	1	59.3 N	47.3 W	00	05	37			1000.0	1.8	3.8	10	26			
UPLF	1	45.3 N	24.5 W	00	28	M 35			1005.7	13.5	15.0	7	10	25	10	14.5
UKWT	1	23.1 N	69.4 W	00	10	56	5 NM									
OVOK	1	59.1 N	43.2 W	06	05	72			1007.0	1.5						
KIHS	1	50.5 N	18.4 W	12	16	M 45	10 NM		1002.2	15.0		5	6.5			
IMPN	1	42.8 N	20.4 W	12	27	M 30	> 25 NM	02	1020.0	18.4	18.2	4	5	26	7	19.5
VRKO	1	50.6 N	25.4 W	12	31	35	10 NM	02	1007.0	9.8	12.5	5	8	27	7	13
UHPO	1	54.9 N	23.0 W	18	01	39			1001.1		11.0	4	5			
GPDT	2	48.1 N	24.8 W	12	24	M 36	.5 NM	63	1011.5	12.7	12.6	3	8	26	5	13
LGNK	2	32.9 N	75.3 W	12	25	35	10 NM		1011.2	25.0	24.9	8	6.5	20	8	6.5
WIAG	2	25.5 N	72.6 W	12	14	18	10 NM	02	1016.1	29.4	24.4	3	5	14	12	49
ARJP	2	35.1 N	12.8 W	18	32	M 13	10 NM	03	1023.7	18.0	20.0	6	5	31	31	55.5
UUVU	2	47.3 N	11.8 W	18	01	35	10 NM									
WLSG	2	39.2 N	34.8 W	18	21	40	1 NM	60	1010.0	18.3	19.4	4	10	22	4	13
WPIM	3	36.2 N	71.3 W	00	32	25	5 NM	02	1012.2	24.0	27.9	8	19.5	24	12	19.5
WGJC	3	41.8 N	60.3 W	06	23	M 60			1007.0	19.0	16.3	3	6.5	24	4	5
LVOH	3	48.9 N	63.4 W	12	30	M 37	10 NM	01	1003.7	7.0	7.0	4	8	30	4	8
LSDT	3	49.7 N	15.8 W	18	16	M 44	1 NM	62	1002.6	13.1	14.0	4	13	27	7	13
GOOP	3	47.8 N	28.4 W	18	33	M 35	10 NM		1008.6	10.0	12.0	3	10	35	6	11.5
KFEY	3	50.0 N	25.0 W	18	02	41	1 NM		0986.8	15.5	13.4	8	16.5	32	10	16.5
UNHA	3	48.2 N	27.0 W	18	27	M 62	2 NM			8.9						
RIGG	3	47.5 N	48.2 W	18	15	36	5 NM		1015.5	5.8	2.7	6	6.5			
VPKP	3	45.5 N	31.6 W	18	31	M 40	10 NM	02	1015.1	11.5	14.0	4	10	31	10	19.5
KFEY	4	49.9 N	27.3 W	00	34	40	.5 NM	63	1000.0	12.0	12.7	9	16.5	34	10	16.5
RIGG	4	47.5 N	48.2 W	00	17	M 36	.25 NM	53	1012.2	5.9	2.6	6	6.5			
GDDT	4	50.2 N	12.5 W	06	15	M 37	5 NM	07	1008.0	13.9	14.0	4	11.5	24	6	11.5
UNHA	4	48.4 N	19.2 W	06	20	M 31			0992.7	11.9	13.2			21	10	19.5
GWDW	4	59.0 N	47.9 W	06	14	M 37	2 NM	69	1009.2	2.9	5.0	5	16.5			
SVHO	4	41.8 N	09.8 W	09	16	14	10 NM		1017.3	17.8	17.0	5	19.5	16	6	3
GPDC	4	47.4 N	26.1 W	12	31	37			1000.8	10.5	13.1	4	11.5	33	8	16.5
FNOU	4	43.3 N	18.5 W	12	24	12	10 NM		1012.0	14.8	15.1	3	5	32	12	19.5
FNZE	4	51.1 N	16.5 W	12	16	M 34	10 NM	02	1005.0	15.8	12.0	3	5	21	7	19.5
GOOP	4	47.1 N	21.3 W	12	23	M 36	5 NM		0998.3	11.0	13.0	4	13	26	8	16.5
KCJD	4	47.1 N	26.6 W	12	31	45	5 NM	56	1002.7	10.0	14.0	5	16.5	34	10	21
UPEV	4	44.7 N	27.7 W	12	29	M 19	10 NM	02	1011.7	9.8	13.0	5	5	36	14	26
USFB	4	50.5 N	31.4 W	12	33	35	10 NM		1011.5	10.5	13.6	13	18			
C7R	4	47.0 N	16.9 W	15	20	25	5 NM		1005.0	13.2	13.6	6	10	19	10	19.5
GOOF	4	52.6 N	31.2 W	18	34	M 37	10 NM	02	1007.9	10.5	13.3	4	10	35	8	19.5
SDZA	4	50.4 N	27.4 W	18	09	M 37	.25 NM	25	0986.0	13.1	12.0	6	14.5	39	6	13
9VPU	5	43.0 N	27.1 W	06	26	M 35	10 NM	02	1007.3	13.5	17.0	5	10	27	12	13
OEJV	5	42.1 N	26.2 W	12	28	24	5 NM		1015.5	15.5	15.5	5	5	36	13	19.5
FNJG	6	09.8 N	16.0 W	06	04	M 75	10 NM	03	1013.2	26.7	28.1					
NCWA	6	27.2 N	70.9 W	09	02	M 61	10 NM	20	1016.9		25.0					
LNVK	6	13.6 N	67.5 W	12	20	43	10 NM		1012.9	28.0	27.0	6	8			
FNPA	6	17.7 N	17.5 W	12	33	M 61	5 NM									
UIIG	6	26.0 N	16.1 W	12	03	60	10 NM		1020.0	21.0						
CG2612	6	43.4 N	65.6 W	18	07	M 35	2 NM	63	1016.0							
SLBU	7	41.8 N	66.2 W	06	05	M 37	1 NM	10	1010.0							
KNDB	7	43.4 N	68.1 W	06	05	M 42	2 NM	59	1014.0	8.0	9.3	4	13	05	5	13
UVNG	7	35.6 N	22.3 W	06	02	43						3	3	27	8	5
NRDT	7	42.3 N	67.9 W	12	08	35	1 NM			8.9						
GUZJ	7	40.6 N	73.6 W	18	04	M 36	10 NM		1013.0							
SPVN	7	47.0 N	40.3 W	18	30	35	10 NM	02	1012.0	0.9	16.0	5	6.5	31	6	6.5

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C. Air	Temperature °C. Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
ATLANTIC	JUNE															
9VPU	8	37.9 N	48.5 W	06	27	M 35	5 NM	02	1014.5	21.5	21.5	4	10	28	9	13
RIGG	8	43.9 N	59.6 W	06	08	26	10 NM		1018.9	6.5	6.1	5	10	15	4	19.5
SQBS	8	34.2 N	53.1 W	06	02	M 36	10 NM	02	1020.2		21.0					
FNZE	8	40.8 N	63.8 W	12	07	M 13	2 NM	51	1006.1	21.2	20.0	3	5	04	9	23
URGX	8	41.0 N	29.3 W	12	30	M 40	.25 NM	18	1009.5	15.5	19.0	2	6.5	32	6	13
CGBV	8	42.9 N	66.4 W	18	05	M 33	.25 NM	62	1011.2	7.8	6.9	6	16.5	36	8	[illegible]
DNCE	8	23.4 N	58.4 W	18	12	35	10 NM		1018.5	27.6	26.3	5	5	13	7	13
GUZJ	8	43.1 N	69.2 W	18	03	M 41	2 NM	60	1012.0							
IRKL	8	37.5 N	57.3 W	18	21	M 68	10 NM	03	1012.0	25.0	22.0	4	8	18	4	8
FNZE	9	40.6 N	69.9 W	00	01	M 35	.5 NM		1007.4	10.0	8.0	3	5	05	6	6.5
KNDB	9	42.4 N	68.2 W	00	02	M 35	2 NM	50	1010.5	10.1	8.7	4	6.5	36	8	13
DNBI	9	41.6 N	65.1 W	00	05	M 43	2 NM	65	1000.0	10.2	9.0	4	6.5	37	9	19.5
ONEE	9	41.4 N	56.0 W	00	08	M 22	1 NM	62	1008.2	15.8	17.5	10	19.5			
IPKL	9	37.5 N	49.8 W	12	21	M 35	5 NM	03	1013.0	24.0	21.0	4	11.5	18	4	8
RIGG	9	43.9 N	59.6 W	12	06	M 38			1012.2	7.6		5	5	12	8	8
SHVN	9	51.9 N	30.7 W	12	05	35	10 NM		1001.0	12.0	11.0	5	6.5	39	8	8
UMVN	9	12.8 N	70.5 W	12	09	M 45	5 NM	01	1010.2	28.7	27.2	4	5			
WNUM	9	37.8 N	73.2 W	12	35	30	> 25 NM	01	1013.9	15.6	18.9	4	8	06	9	19.5
KFEM	9	37.4 N	69.0 W	18	34	37	5 NM	02	1016.5	17.8	25.6	6	6.5	34	10	11.5
PJYG	9	38.1 N	71.5 W	18	35	35	10 NM	01	1013.1	17.5	20.1	6	8	01	8	13
GRGX	10	42.9 N	37.0 W	00	29	M 79	5 NM									
KHLX	10	41.3 N	63.6 W	06	03	36	2 NM	60	1003.5	8.8	10.0	10	23			
PFMS	10	32.0 N	49.3 W	06	12	M 61	10 NM									
9VPU	10	34.6 N	67.2 W	12	33	36	10 NM	81	1005.0	20.0	24.5	5	11.5	34	9	13
DGGC	10	44.4 N	25.1 W	12	27	M 50	10 NM	03	1014.3	24.9	14.7	5	6.5	31	13	18
FBGA	10	15.2 N	58.4 W	12	08	35	10 NM	02	1015.5	26.0	27.0	6	6.5	06	6	8
FNNW	10	38.5 N	48.0 W	12	23	M 14	10 NM		1011.5	22.0	28.0	5	3	27	8	37.5
GTHW	10	48.0 N	21.9 W	12	25	M 42	10 NM	02	1003.3	14.8	13.8	5	13	25	9	24.5
GUSW	10	45.1 N	27.3 W	12	27	M 20	10 NM	01	1014.0	14.1	14.6	2	1.5	30	7	19.5
IBXL	10	37.5 N	39.5 W	12	25	M 38	10 NM	03	1012.0	22.0	20.0	4	13	18	4	6.5
KFEM	10	41.1 N	61.0 W	18	05	44	2 NM	51	1000.4	17.2	25.6	6	8	05	12	19.5
LGXE	10	35.0 N	70.5 W	18	35	M 48	10 NM	02	1012.2	26.5	22.0	10	13	35	12	16.5
OVOK	10	59.0 N	38.6 W	18	02	M 35	5 NM	01	1026.0	8.0						
SLNA	10	41.6 N	61.7 W	18	06	M 37	1 NM	63	1004.5	12.8	13.0	10	16.5			
WSNH	10	41.3 N	60.0 W	18	08	M 44	2 NM	60	1004.5	18.0	20.0	5	16.5			
KFEM	11	42.6 N	57.5 W	06	05	40	5 NM	50	1012.0	8.9	15.6	6	8	05	12	16.5
OVOK	11	59.1 N	34.3 W	06	03	M 47	5 NM	02	1019.3	7.5						
WSNH	11	41.1 N	60.3 W	06	05	M 41	2 NM	10	1011.2	11.0	15.0	5	16.5			
FTIR	11	37.7 N	09.4 W	12	34	M 20	> 25 NM	28		17.6		13	19.5	31	5	6.5
SIGT	11	43.8 N	45.9 W	18	05	M 35	5 NM	25	1010.8	15.1		6	6.5	XX	10	6.5
SLNA	11	42.8 N	53.9 W	18	07	24	10 NM		1013.0	10.3		22	39			
UIRV	11	21.8 N	28.8 W	18	03	60	10 NM		1019.2	23.0						
NZNL	12	17.8 N	66.9 W	00	13	12	5 NM	01	1015.0	27.8	26.7	13	19.5	13	13	5
FNUI	12	31.7 N	14.1 W	12	03	35	10 NM		1023.0	20.6	21.0	6	10			
GPEE	12	30.7 N	71.7 W	12	06	M 15	5 NM		1015.0	21.9	24.0	2	3	03	69	29.5
GYSJ	12	47.1 N	06.7 W	18	21	M 58	10 NM	18	1008.5	15.0	15.0	3	6.5	25	7	13
5LSD	13	35.5 N	50.7 W	12	25	M 37	5 NM	80	1011.0	23.0	21.0	4	6.5	24	4	6.5
KLEZ	13	13.2 N	80.6 W	12	09	M 35	5 NM	29	1013.2	25.0	28.3	4	6.5	39	6	13
GXHY	13	38.8 N	59.1 W	18	03	20	10 NM		1022.7	18.8	21.0	2	5	04	7	19.5
PHVW	14	42.4 N	09.6 W	00	26	M 41	5 NM	02	1022.7	16.3						
EACG	14	38.8 N	41.5 W	12	35	M 40	10 NM	02	1014.5	16.0						
SGGL	14	44.4 N	09.0 W	12	24	M 35	2 NM	50	1017.6	17.2				25	7	6.5
WFLH	14	40.9 N	36.5 W	12	03	35	200 YD	21	1009.5	13.3	16.1	3	5	03	8	5
GLAQ	14	35.5 N	17.7 W	18	36	M 43	10 NM	02	1020.4	19.0	19.0	4	6.5	36	4	6.5
SOBO	14	36.2 N	64.9 W	18	18	M 39	10 NM			24.9						
WSVB	14	41.1 N	48.1 W	18	35	M 38	10 NM	02	1020.5	16.0	1.7	4	5	35	7	9
SOBO	15	37.0 N	63.2 W	00	16	M 50	10 NM			24.4						
SMPQ	15	39.5 N	25.5 W	12	21	M 40	5 NM	02	1007.5	19.5	19.0	6	13	18	5	13
9VPR	15	38.4 N	58.3 W	12	17	M 37	5 NM	07	1015.1	22.0	22.8	4	16.5	15	6	19.5
KYVK	15	34.7 N	71.8 W	12	33	M 17	10 NM	02	1019.0	23.3	22.2	2	3	33	0	35
FNZE	15	44.3 N	56.0 W	18	15	M 35	.5 NM	61	1013.0	13.5	7.5	3	6.5			
UUDH	15	38.5 N	58.0 W	18	16	M 45	5 NM	61	1009.9	21.2	22.0	6	10	05	6	5
9VPR	16	38.7 N	53.6 W	00	18	M 39	5 NM		1014.5	21.5	19.0	4	13	17	5	16.5
SOBO	16	39.8 N	57.3 W	00	22	M 43	5 NM			20.8						
WCJS	16	36.8 N	29.8 W	06	30	40	> 25 NM	01	1016.0	17.8	19.4	4	8	32	5	11.5
FNZE	16	44.0 N	48.3 W	09	14	M 35	10 NM	80	1012.6	11.5	7.0	4	6.5			
EACG	16	39.2 N	55.5 W	12	28	M 45	10 NM	02	1014.5	20.0						
FNUV	16	41.4 N	22.5 W	12	26	M 37	2 NM	18	1005.8	17.0	16.0	6	11.5	26	9	13
GRST	16	44.3 N	26.7 W	12	33	M 35	10 NM	01	1006.7	13.0	14.6	3	6.5	XX	4	9
GPHU	16	18.7 N	67.0 W	12	11	21	5 NM	61	1008.0	27.0	32.0	6	5	11	6	21
CGBV	16	42.7 N	66.0 W	18	21	M 35			1009.6	14.0	9.5	3	8	22	6	14.5
DSLC	16	42.1 N	53.1 W	18	28	M 39	5 NM	02	1007.5	16.5	16.0	4	13	27	0	28
RIGG	16	47.5 N	48.2 W	18	10	M 35	1 NM	61	1012.0	5.9	4.6	5	6.5			
WVFN	16	46.8 N	48.7 W	18	09	M 42	.5 NM	61	1008.1	7.6	5.2	7	8			
NPCR	17	17.7 N	75.7 W	00	11	M 35	5 NM	13	1013.5	27.8	27.2					
WVFN	17	46.8 N	48.7 W	00	09	35	5 NM	61	1005.5	7.8	5.0	7	8			
ZAPATA	17	47.5 N	48.2 W	00	09	M 42	.5 NM	61	1003.9	6.9	4.1	6	6.5			
RIGG	17	47.5 N	48.2 W	03	08	M 36	2 NM		1007.0	6.3						
FNNX	17	50.0 N	27.5 W	06	01	40	10 NM		1006.5	12.5	12.2	6	10	01	6	13
FNZE	17	45.3 N	38.9 W	06	14	M 35	10 NM	02	1013.9	13.0	13.0	5	8			

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C Air	Temperature °C Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
ATLANTIC	JUNE															
GDVG	17	57.1 N	17.0 W	06	09	M 44	2 NM	63	1007.1	12.4		3	10	11	4	10
GZHB	17	43.0 N	27.4 W	06	28	M 35	10 NM	15	1011.5	13.6	16.3	4	5	31	8	9
D7CW	17	46.0 N	18.7 W	12	29	M 35	5 NM	18	1003.0	15.0		6	13	29	5	19.5
GPEY	17	21.7 N	86.6 W	12	15	30	2 NM	97	1005.9	27.0	26.0	5	6.5	15	5	19.5
GPHU	17	25.2 N	87.2 W	12	12	21	10 NM	15	1009.4	26.5	30.0	6	5	13	6	19.5
GPEE	17	49.7 N	23.0 W	12	30	M 37	2 NM	60	0998.6	13.1						
SJPP	17	52.3 N	27.3 W	12	33	M 58	10 NM	02	1007.0	15.2		5	11.5	33	7	16.5
SOCW	17	41.8 N	27.5 W	12	28	M 35	10 NM			16.0						
VPLK	17	13.5 N	74.7 W	12	10	35	10 NM	73	1012.7	27.7	27.7	6	8	12	10	11.5
WFLH	17	40.1 N	66.0 W	12	22	35	10 NM	02	1014.4	23.3	23.9	4	6.5	22	9	8
WSNH	17	41.4 N	48.4 W	12	29	M 48	10 NM	02	1015.7	16.0	17.0	3	6.5	29	7	10
DBFP	17	49.8 N	22.9 W	15	32	35	5 NM		1001.0	13.5						
FNGH	17	46.5 N	02.5 W	18	29	M 35	5 NM	29	1009.0	16.8	17.0	4	5			
IRGD	17	40.2 N	37.4 W	18	24	M 15	10 NM	02	1013.8	20.5	16.5	5	8	23	7	23
UOST	17	43.2 N	15.4 W	18	29	35	10 NM	01	1018.9	16.1	18.0	6	6.5	23	8	10
EMAJ	18	48.2 N	44.8 W	00	22	M 75	1 NM	55	1007.9	5.0	7.2			20	8	5
UOST	18	42.6 N	16.5 W	00	27	43	10 NM	01	1024.0		18.0	6	6.5	23	8	5
CTR	18	47.0 N	17.0 W	03	28	M 33	5 NM	75	1008.3	12.2	13.9	7	23	23	10	10
GSRD	18	49.3 N	04.2 W	06	23	M 44	5 NM	75	1006.0	14.2	13.5	4	5	25	5	6.5
GUEL	18	06.4 N	14.6 W	06	02	M 65	10 NM	01	1013.5		29.0					
DWGW	18	59.0 N	18.0 W	06	09	M 37			1007.2	11.0	13.9	6	14.5			
PFMS	18	48.6 N	13.1 W	06	26	M 40	5 NM	72	1004.0	14.8	15.0	10	16.5			
HIGG	18	43.9 N	59.6 W	06	02	M 59	< 50 YD	47	1010.7	11.5		4	1.5	23	5	3
ELDJ	18	24.4 N	82.5 W	12	17	M 40	2 NM	62	1010.8	27.6	28.3	5	6.5	17	5	6.5
GPEE	18	50.0 N	14.9 W	12	26	M 35	10 NM	01	1006.8	14.6	15.0	4	13	29	8	19.5
SOAG	18	45.0 N	08.2 W	12	25	M 39	5 NM	25	1017.0	18.0						
UIHS	18	47.2 N	12.0 W	12	01	M 39	10 NM									
DICI	18	49.5 N	12.2 W	18	24	58	5 NM		1011.7	15.3	15.3	4	10	27	6	11.5
EPDK	18	37.7 N	17.2 W	18	35	M 13	10 NM	03	1021.7	19.5	19.5	2	5	34	4	19.5
SJRP	18	56.7 N	14.0 W	18	06	M 47	50 YD	20	1001.8	13.2		10	18	08	10	11.5
VPNZ	18	46.5 N	08.4 W	18	26	M 36	10 NM	72	1017.1	15.5						
KNDB	18	32.4 N	79.2 W	21	17	M 50	1 NM	62		24.5	26.4	8	16.5	16	10	21
LPBK	19	39.0 N	11.6 W	06	35	M 09	10 NM	02	1018.6	17.0	18.0	2	3	34	6	23
GNEM	19	32.1 N	76.9 W	06	22	M 46	5 NM	15	1004.5	26.1		6	19.5	20	8	19.5
GUSW	19	48.9 N	06.1 W	06	27	M 15	10 NM	01	1015.4	14.5	15.0	3	5	28	9	29.5
TSLM	19	48.9 N	05.0 W	06	22	15	10 NM		1015.0	19.0	12.0	8	3	27	8	19.5
GUZJ	19	35.8 N	74.8 W	12	19	M 40	2 NM	82		19.0						
KMJH	19	33.4 N	74.0 W	12	20	40	5 NM	82	1007.1	23.3	17.0	4	6.5	20	6	13
ZJNB	19	43.3 N	22.6 W	12	25	M 44	5 NM	01	1000.2	17.0	14.5	5	5	26	7	10
PJKR	19	36.5 N	77.2 W	15	20	56	5 NM		1002.2	24.2		8	16.5			
FNOP	19	47.3 N	13.0 W	18	01	M 48			1010.5		14.9	5	6.5			
GYHY	20	35.3 N	75.0 W	00	25	M 13	5 NM	02	1009.5	24.3	23.8	3	5	17	7	24.5
WNUW	20	37.4 N	77.8 W	00	31	10	50 YD		1005.8	16.2	17.8	3	3	31	12	31
EIDR	20	40.6 N	65.7 W	06	26	M 37			0992.5	20.0		4	16.5	18	6	16.5
FNZE	20	52.5 N	05.7 W	09	01	M 58	5 NM	01	1016.1		10.0					
GZWQ	20	36.7 N	67.3 W	12	27	M 43			1013.1	22.0	25.0	6	16.5			
9VKX	20	39.8 N	59.9 W	12	25	48	5 NM	02	1004.0	26.0	24.0	7	8	25	11	14.5
FNCH	20	39.6 N	60.5 W	12	23	40	5 NM		1005.5	24.5	22.0	6	16.5			
VWGR	20	47.4 N	59.4 W	12	09	M 37	200 YD	76	1003.5	9.6	6.5					
KSLB	20	42.0 N	58.8 W	14	24	M 50	.25 NM	60	0995.9	18.9	16.2	6	13	25	8	13
GVHY	20	44.1 N	58.5 W	15	21	M 35	.25 NM	61	0985.7	10.8	8.0	6	8	13	5	3
YTAG	20	38.6 N	62.6 W	15	27	35	10 NM		1011.5	26.5	25.0	5	8	27	14	24.5
EWPM	20	41.2 N	58.9 W	18	23	39	2 NM		1001.9	23.0	1.4	12	13			
FNNX	20	46.6 N	56.9 W	18	08	M 38	1 NM	65	0993.7	8.0	6.9	5	6.5			
KFGJ	20	40.9 N	56.6 W	18	27	M 40	2 NM	07	1003.0	24.0	20.0	9	11.5	26	9	11.5
GFDS	20	43.3 N	60.6 W	18	25	M 35	1 NM	60	0996.3	13.0	9.6	12	10			
VCSZ	20	46.0 N	56.1 W	18	08	M 49	1 NM	65	0987.0	9.0						
VPFQ	20	39.9 N	61.0 W	18	28	M 37	5 NM	03		23.5	22.5	7	11.5	26	9	19.5
ZCSN	20	14.8 N	73.0 W	18	09	38	5 NM		1011.9	29.0	28.5	4	6.5	09	9	11.5
GFBA	21	14.8 N	56.4 W	00	02	70	10 NM		1017.2			1	1.5	11	5	3
GENI	21	13.8 N	18.6 W	00	34	27	5 NM		1020.3	24.6	24.6	3	3	30	0	49
WHEH	21	09.8 N	79.0 W	00	22	M 10	10 NM	01	1008.0	28.3	25.0	4	18	08	10	21
ZCSN	21	15.6 N	72.0 W	00	09	38	5 NM		1011.3	29.0						
WVFN	21	46.8 N	48.7 W	03	10	M 50	1 NM	63	0997.1	8.7	6.4	6	8			
ELGY	21	44.7 N	57.1 W	06	26	M 38			0996.5	8.0	1.0	6	5	19	6	11.5
KTGG	21	47.5 N	48.2 W	06	10	M 48	1 NM	61	0992.7	7.2	5.2	6	8			
VCSZ	21	47.0 N	52.5 W	06	34	M 40	5 NM	73	0990.0	8.0						
IFHB	21	48.5 N	51.5 W	09	04	M 37	1 NM	65		6.0	5.4					
PIOD	21	39.6 N	11.1 W	12	20	M 35	5 NM		1018.4	20.1						
SOBO	21	54.7 N	21.4 W	12	09	M 41	10 NM			17.3						
SOCW	21	45.8 N	49.3 W	12	25	M 44	2 NM	52	0997.0	8.8	4.0					
WBJC	21	45.4 N	42.4 W	12	17	M 40	2 NM	60	1004.0	17.6	13.0	4	6.5	19	6	10
GDLH	21	44.1 N	45.5 W	15	24	M 44	5 NM		1005.5	15.1	17.5	6	10	24	5	11.5
DSFO	21	44.8 N	45.4 W	18	25	40	5 NM	02	1006.0	14.0	12.0	12	19.5	30	12	19.5
GPJW	21	36.6 N	52.2 W	18	25	M 16	5 NM	02	1019.6	24.5	21.9	4	5	27	10	23
KLJH	21	44.5 N	45.4 W	18	27	35	5 NM	02	1005.5	11.7	15.6	5	8	27	10	14.5
GMAJ	21	47.5 N	50.2 W	18	34	M 39	.5 NM		1002.5	10.1	12.0					
UVEH	21	50.3 N	44.6 W	13	09	M 43	.5 NM		1004.1	10.8	11.0	12	13			
9VVK	22	49.5 N	09.3 W	00	07	M 35	1 NM	63	0996.0	15.5	15.0					
DSFO	22	44.2 N	45.8 W	00	27	47	5 NM	03	1011.0		16.0	5	10	27	6	11.5

† Direction for sea waves same as wind direction
X Direction or period of waves indeterminate
M Measured wind

NOTE: The observations are selected from those with winds ≥ 35 kn or waves ≥ 25 ft from May through August (≥ 41 kn or ≥ 33 ft, September through April).

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C Air	Temperature °C Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
ATLANTIC	JUNE															
KLJH	22	42.8 N	47.3 W	00	27	35	5 NM	02	1013.9	9.9	16.7	5	8	29	6	10
GUVD	22	47.4 N	10.2 W	00	27	M 35	2 NM	63	1015.5	13.6	16.0	8	6.5	27	10	10
GYZX	22	51.5 N	40.5 W	00	12	35	.25 NM		1002.1	7.9	10.8	5	6.5			
LVIV	22	48.0 N	44.4 W	06	29	M 35	2 NM			2.2	8.0	10	10			
GTHU	22	49.0 N	27.0 W	06	22	M 36	5 NM	80	0997.5	14.3	14.8	2	6.5	24	5	10
GYAP	22	48.0 N	28.2 W	06	23	M 40	5 NM	25	1000.6	14.6	14.2	6	16.5			
GTCI	22	41.9 N	47.6 W	12	27	M 47	10 NM	03	1020.5	16.3	18.5	6	5	27	3	3
GOZT	22	51.8 N	41.6 W	12	36	M 39	1 NM	51	1002.0	8.2	8.9	3	10			
KFCM	22	49.5 N	08.8 W	12	27	37	2 NM	62	0991.5	15.6	13.9	5	13	28	10	16.5
KVPV	22	47.7 N	43.9 W	12	29	M 35	2 NM	10	1011.0	6.0	3.5	9	10			
[illegible]	22	49.6 N	26.5 W	12	22	M 40	2 NM	64	0998.0	14.1						
[illegible]	22	56.9 N	13.9 W	12	05	M 45	10 NM			17.6						
GWCE	22	52.0 N	40.7 W	12	08	39	1 NM	53	1000.2	7.0	7.0	6	11.5			
[illegible]	22	49.8 N	08.8 W	15	20	M 39	10 NM	25	0999.2	16.2	14.0	3	6.5	21	4	6.5
[illegible]	22	21.6 N	17.9 W	18	02	35	5 NM		1011.8	19.0	18.0	8	11.5	36	13	16.5
[illegible]	22	49.8 N	08.6 W	18	23	M 37	1 NM	81	0993.5	14.2		6	26	24	9	16.5
GHJW	22	50.3 N	28.3 W	18	32	M 24	5 NM	02	0993.3	10.1	11.1	3	8	21	10	19.5
GYFK	22	58.7 N	30.1 W	18	07	M 37	10 NM	03	1016.5	10.8	9.0	1	5	07	8	13
GDDC	22	46.7 N	31.7 W	18	26	35	10 NM		1003.9	15.0	14.0	10	13	00	0	0
GPLL	22	49.8 N	23.6 W	18	20	35	10 NM		1008.1	14.8	14.0	5	8			
[illegible]	22	46.8 N	30.4 W	18	24	35	10 NM	02	1005.0	18.5	14.0	5	5	22	6	5
[illegible]	22	24.7 N	07.5 W	18	18	20	10 NM		1015.0	25.6	23.9	2	1.5	18	18	36
[illegible]	22	47.9 N	37.9 W	18	28	51	5 NM	60	1001.5	13.9	13.0	8	23	28	12	28
[illegible]	23	53.7 N	36.3 W	00	09	M 25	2 NM	80	1004.5	7.7	8.3	4	10	23	6	23
[illegible]	23	24.7 N	09.2 W	00	18	20	10 NM	01	1015.0	25.6	23.9	2	1.5	18	18	36
GHJW	23	49.4 N	39.5 W	06	29	M 40	5 NM	02	1012.0	9.8	11.7	3	8	30	10	21
GTID	23	46.7 N	17.2 W	06	24	M 36	5 NM	16	1008.6	15.2	16.0	8	16.5			
[illegible]	23	46.6 N	32.3 W	06	28	52	5 NM		1002.6	11.0	13.0	16	21	00	0	0
[illegible]	23	47.1 N	38.9 W	06	31	36	10 NM	02	1013.8	12.8		8	16.5	30	12	29.5
[illegible]	23	46.0 N	31.5 W	12	32	M 46	2 NM	97	1002.5	13.2	11.9	3	16.5	27	4	19.5
[illegible]	23	47.5 N	07.3 W	12	24	M 35	.5 NM	81	1008.6	15.0	15.7	8	11.5	21	9	13
[illegible]	23	58.7 N	04.7 W	12	04	M 35	10 NM			12.2						
[illegible]	23	48.1 N	05.3 W	12	25	M 31	5 NM	02	1000.0	15.0	14.0	12	19.5			
[illegible]	23	49.7 N	08.9 W	12	27	40	5 NM	02	1011.5	15.0	12.7	6	8	27	6	8
[illegible]	23	27.1 N	68.0 W	15	31	M 72	10 NM	71	1023.0	29.0	29.0	7	5	31	3	19.5
[illegible]	23	22.8 N	67.7 W	18	12	M 20	5 NM	15	1022.3	27.5	27.0	3	1.5	10	10	36
[illegible]	23	42.4 N	17.3 W	18	29	40	10 NM		1016.6	16.0	16.2	5	13	32	10	16.5
[illegible]	23	45.7 N	07.9 W	18	23	16	10 NM		1013.9	19.5		22	23	28	8	10
[illegible]	24	46.4 N	27.9 W	00	30	M 35	1 NM	62	0997.5	13.0	13.5					
[illegible]	24	44.4 N	67.8 W	00	17	63	< 50 YD	45	1008.5	10.5						
[illegible]	24	47.8 N	17.3 W	06	29	21	10 NM		1014.2	14.6	14.9	2	3	28	8	29.5
[illegible]	24	46.7 N	35.2 W	06	32	50	5 NM		1012.0	20.0	13.0	10	16.5	00	0	0
[illegible]	24	28.8 N	17.6 W	06	35	19	10 NM	02	1017.6		18.5	22	21			
[illegible]	24	19.3 N	18.8 W	12	35	M 64	10 NM									
[illegible]	24	51.7 N	56.9 W	18	05	M 36	1 NM	61	1009.2	3.0						
[illegible]	24	44.3 N	17.7 W	18	24	M 32	10 NM	25	0995.8	15.0		6	11.5	26	8	19.5
[illegible]	24	40.9 N	71.3 W	18	27	M 40	5 NM	02	1014.2	17.2						
GTCI	25	34.1 N	63.2 W	12	20	M 41	5 NM	80	1015.5	23.8	24.8	3	5	20	5	6.5
[illegible]	25	38.5 N	60.8 W	12	25	12	10 NM		1014.9	20.1	18.8	3	5	30	7	21
[illegible]	25	31.9 N	18.1 W	18	36	13	10 NM		1024.0	21.3	20.0	7	6.5	35	8	36
[illegible]	25	19.8 N	77.2 W	18	08	M 40	5 NM	71	1012.0	28.1	28.1	6	11.5			
[illegible]	26	18.1 N	76.2 W	00	08	M 40	5 NM	02	1012.5	27.7	28.0	6	11.5			
[illegible]	26	51.4 N	07.9 W	06	01	35			1000.9			6	5			
[illegible]	26	48.5 N	26.3 W	11	15	M 36	5 NM	81	1006.9	14.6	14.0	5	14.5	22	12	9
[illegible]	26	46.5 N	36.7 W	12	27	M 35	5 NM	15	1008.0	14.5	14.0	3	5	27	5	8
[illegible]	26	59.2 N	59.2 W	12	08	M 24	10 NM	02	1007.2	10.6	11.9	4	10	08	10	19.5
[illegible]	27	40.9 N	49.8 W	00	01	55	10 NM		1020.5		17.8			19	5	6.5
[illegible]	27	44.4 N	58.4 W	06	01	70										
[illegible]	27	38.7 N	71.7 W	06	11	61	5 NM									
[illegible]	27	55.9 N	20.7 W	09	16	53	5 NM		1002.5	12.2						
[illegible]	27	15.2 N	77.2 W	18	10	35	5 NM	18	1015.0	27.8	30.0	4	13			
[illegible]	27	13.0 N	78.6 W	18	13	M 35			1011.7	29.0	27.0	6	13			
[illegible]	28	45.7 N	08.2 W	06	01	M 79	5 NM	17	1017.3		16.1	7	8	22	5	7
[illegible]	28	09.2 N	47.7 W	06	06	M 35	2 NM	53	1012.5	6.0						
[illegible]	28	16.5 N	81.5 W	12	02	M 36	5 NM	02	1014.1		27.9	3	5	08	7	9
[illegible]	28	44.7 N	44.8 W	18	01	42		02	1012.9		12.0	7	6.5			
[illegible]	28	47.8 N	07.6 W	19	07	35	10 NM		1016.0	21.2		6	6.5	27	17	10
[illegible]	28	53.7 N	27.7 W	18	27	M 35	10 NM	02	1014.5	13.0	14.0	8	8			
[illegible]	29	36.7 N	17.5 W	06	13	M 41	10 NM	01	1018.5	19.4						
[illegible]	29	18.4 N	87.1 W	12	09	21	10 NM	15	1013.3	28.0	31.0	7	5	09	7	19.5
[illegible]	29	59.9 N	28.0 W	18	26	09	10 NM		1010.3	12.0	11.0	0	0	22	8	21
[illegible]	29	47.6 N	29.8 W	18	04	41	10 NM		1024.2	18.0						
[illegible]	29	46.8 N	37.7 W	18	30	M 31	10 NM		1015.6	10.5	15.0	9	19.5			
[illegible]	30	15.2 N	60.5 W	00	09	40			1011.9	29.0	28.3	4	6.5	09	6	10
[illegible]	30	37.8 N	70.9 W	00	17	16	5 NM	02	1011.6	25.6	19.4	3	3	18	18	29.5
[illegible]	30	38.1 N	11.9 W	06	02	35	10 NM		1027.5	18.4	20.0	7	10			
[illegible]	30	40.8 N	27.6 W	11	27	M 40	5 NM	07	1005.2	14.0	12.5	5	18	26	6	23
[illegible]	30	49.3 N	16.4 W	12	24	M 37	10 NM	03	1013.5	16.0	15.0	7	8	23	5	11.5
[illegible]	30	30.1 N	38.6 W	12	11	58	10 NM	02	1027.2	26.0	25.0					
KIVI	30	34.6 N	15.5 W	15	07	43										
[illegible]	30	44.0 N	19.7 W	15	18	M 35	50 YD	47	1005.2	14.4		2	1.5			
[illegible]	30	49.1 N	20.5 W	18	27	25	10 NM		1017.2	13.7	13.8	8	10	27	16	19.5
[illegible]	30	49.8 N	20.7 W	18	24	M 40			1015.6	13.0	14.0	4	10	24	6	1.5
[illegible]	30	44.1 N	58.5 W	18	18	M 77	< 50 YD	45	1005.5	13.0	9.0	5	5			
GR. LAKES	JUNE															
WF2451	11	47.1 N	88.1 W	00	28	M 38	10 NM	01		7.0	3.0	6	5			
WF2122	27	46.5 N	86.5 W	12	22	50	10 NM									

North Pacific Selected Gale and Wave Observations

April, May and June 1982

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C. Air	Temperature °C. Sea	Sea Waves* Period sec.	Sea Waves* Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
PACIFIC	APR.															
VRKM	1	38.1 N	145.4 E	00	36	54	5 NM		1008.9	5.4		3	11.5	34	5	13
EPEC	1	37.1 N	146.9 E	06	34	M 50	5 NM	80	1007.8	9.0	13.0	9	26			
VRLU	1	36.0 N	148.9 E	06	31	M 35	5 NM	01	1000.0	14.5	17.5	9	19.5	31	9	26
ELYM	2	35.6 N	146.9 E	00	36	M 28	10 NM		1021.0	8.0	18.0	12	28	36	12	28
JFOT	2	49.9 N	152.6 W	00	32	M 39	2 NM	71	1020.5	2.0	4.5	4	5	37	8	39
JIYY	2	52.7 N	151.1 W	00	34	M 33	.5 NM	73	1013.5	2.0	3.0	5	11.5	32	8	26
WGJW	2	52.2 N	155.0 W	06	31	24	10 NM	03	1023.2	1.0	5.0	5	13	02	7	24.5
KJDG	3	42.6 N	127.5 W	18	24	50	5 NM	07	0994.8	8.3	8.9	8	13	24	14	32.5
DZAW	3	19.1 N	120.9 E	00	02	M 04	10 NM	02	1013.5	28.0	26.0	2	3	02	0	34.5
WCIO	3	42.9 N	128.0 W	00	27	M 30	5 NM	81	0999.0	6.7	9.4	4	8	27	9	24.5
H9EV	3	53.4 N	174.0 E	12	34	M 60	50 YD	29	1002.0							
7KH2	3	10.6 N	88.3 W	18	05	M 80	10 NM	01	1013.0	28.0						
GOYT	4	43.1 N	155.4 E	00	28	M 34	10 NM	02	0998.5	3.1	4.1	8	16.5	27	9	29.5
JMMY	4	38.1 N	159.6 E	00	20	M 30	10 NM	03	1014.0	15.0	15.0	6	8	18	8	32.5
EVBV	4	47.0 N	152.2 E	12	32	M 50	1 NM	71	1002.2	- 4.3	1.8	3	1.5			
HPVK	4	35.5 N	144.6 E	23	36	M 26	5 NM	02	1029.0	8.0		16	29.5	36	12	29.5
ELYM	5	41.6 N	165.4 E	00	27	M 22	10 NM	41	1008.0	2.0	9.0	10	26	27	10	26
JPRH	5	44.5 N	143.4 E	00	00	00	5 NM		1020.0					04	10	32.5
SMPK	5	23.5 N	122.5 E	05	01	M 26	2 NM	80	1018.5	21.0	25.0	10	26	01	8	16.5
ARCM	5	51.9 N	174.6 E	06	21	M 58	2 NM	54	0980.0	5.0	6.0	6	19.5	21	14	16.5
DZUT	5	49.9 N	172.3 E	06	23	M 50	2 NM		0984.0	4.0	0.4	10	23	23	11	23
JFOT	5	49.0 N	173.5 W	06	16	M 62	2 NM	61	1014.0	6.0	4.0	5	10	15	7	14.5
JFWU	6	46.6 N	156.4 E	06	25	M 37	.5 NM	22	1002.0	- 1.0	1.0	5	6.5	31	10	24.5
3ZZD	5	53.9 N	177.2 E	17	21	M 49			0983.0	3.0	4.0	7	11.5	24	9	13
3PNY	5	34.6 N	121.4 E	12	03	60	10 NM		1024.6	7.7						
UYDY	6	46.7 N	151.9 E	00	12	64	10 NM		1008.6	3.0	1.0	2	8			
WAPD	6	41.8 N	146.2 E	00	25	M 35	10 NM	01	1016.0	6.6	1.6	5	11.5	25	9	29.5
GOZH	6	28.5 N	177.7 E	18	02	M 58	10 NM	02	1017.2	19.3	19.3	6	11.5	02	7	13
JDWH	7	49.8 N	178.3 E	00	13	M 50	.5 NM	73	0997.0	3.0	4.0	5	16.5	29	16	16.5
JFOT	7	45.8 N	178.3 E	00	23	M 60	10 NM	02	1013.0	4.0	5.0	6	10	27	7	13
DFNW	7	44.8 N	168.6 E	06	28	M 22			1012.0	10.0	2.0	50	32.5			
WVHS	7	52.2 N	151.3 W	06	34	74										
JIYY	7	50.9 N	178.0 E	09	25	M 50	200 YD	86	1004.0	5.0	3.5	6	16.5	25	9	19.5
GOZH	7	30.0 N	177.3 W	18	02	M 78	5 NM	80	1011.9	16.5	17.2			02	8	19.5
HPVK	7	38.9 N	164.2 E	23	18	M 18	2 NM	04	1032.5	10.0		10	13	18	12	29.5
GOZH	8	30.0 N	176.1 W	00	02	M 78	2 NM	80	1010.5	17.0	17.4	8	16.5	02	8	16.5
HOVS	8	38.5 N	153.3 E	00	16	M 52	200 YD	18	1013.5	13.0	11.0	9	14.5	15	9	13
HJNM	8	32.1 N	177.0 E	18	09	40	10 NM	02	1022.0	14.5		XX	23	03	XX	24.5
JAHY	8	37.4 N	146.1 W	18	04	M 48	5 NM	05	1019.5	9.5	17.5	8	10	03	7	13
ESXKU8	8	17.8 N	149.5 W	23	01	M 55			1012.1							
HPVK	8	40.3 N	171.1 E	23	18	M 22	2 NM	04	1038.0	17.1		12	16.5	19	12	32.5
BLHY	9	38.9 N	162.8 E	00	16	M 25	5 NM	03	1029.5	14.5	13.0	7	32.5			
H9ZD	9	50.7 N	175.1 W	00	24	M 34			1039.0	6.0	3.0	11	24.5	24	11	24.5
3FFK	9	29.0 N	128.1 E	03	33	M 50	5 NM	07	1020.0	13.5	21.0	4	16.5	34	7	19.5
GNAP	9	32.2 N	179.1 E	06	05	M 44	2 NM	21	1017.5	16.0	17.0	6	23	06	14	29.5
KGJP	9	29.9 N	130.7 E	06	30	M 50	10 NM	25	1013.5	13.5	24.0	5	8	32	8	10
JIYY	9	48.0 N	166.5 E	09	18	M 38	2 NM	63	1024.0	7.0		0	24.5			
HJNM	9	31.5 N	178.3 E	12	06	42	.25 NM		1017.0	15.0		XX	29.5	07	XX	26
TENK	9	26.5 N	123.4 E	12	07	M 70	10 NM	02	1025.4	13.2						
JCUD	9	33.5 N	143.7 E	18	23	M 52	2 NM	64	1003.6	19.9		8	13	25	7	13
KHGH	9	34.9 N	140.8 E	18	26	M 50	5 NM	03	0999.3	14.0	19.0	3	10	25	8	8
HPVK	9	40.5 N	177.2 E	23	09	M 24	2 NM	04	1040.5	11.0		14	23	09	13	36
6ZGT	10	35.1 N	135.3 E	00	23	M 48	5 NM	60	1003.0	19.0	18.0	3	18	23	12	13
BLHY	10	39.7 N	172.9 E	00	08	M 22	1 NM	52	1037.5	13.5	14.0	7	32.5			
JMJL	10	34.5 N	143.1 E	00	23	40	2 NM		0999.6	11.5	18.3	8	16.5	25	11	26
KPDH	10	52.0 N	174.5 E	00	23	45	2 NM	60	1028.0	5.0	5.5	4	19.5	26	12	49
D5HD	10	35.6 N	177.4 E	06	07	54	5 NM		1029.7	17.5	14.0	8	11.5	09	10	13
DLDE	10	34.8 N	146.0 E	06	23	M 50	2 NM	80	1006.9	14.0	19.0	10	16.5	24	13	23
GNAP	10	31.6 N	172.8 E	06	07	M 30			1019.3	16.3	16.0	5	11.5	07	13	26
UWAA	10	35.5 N	171.6 E	06	08	21	5 NM		1029.3	15.5	15.0	7	6.5	26	12	26
HJNM	10	32.5 N	179.5 E	12	06	40	5 NM	02	1024.0	17.0		XX	26	XX	XX	19.5
HPVK	10	40.7 N	176.5 W	23	27	M 24	2 NM	04	1039.0	12.1		14	23	27	13	36
BLHY	11	40.3 N	176.3 W	00	05	M 22	10 NM	02	1038.0	13.0	17.0	8	29.5			
EWCF	11	35.5 N	125.9 W	06	01	M 54	10 NM	01	1005.5			8	10	16	14	11.5
JIFS	11	54.1 N	156.1 W	06	31	M 51	5 NM	07	1010.4	2.0	3.0	7	11.5	30	8	19.5
KLHZ	11	56.1 N	143.4 W	06	23	M 21	5 NM	51	0986.2	3.9		3	5	XX	XX	54
HPVK	11	40.7 N	169.9 W	23	05	M 10	5 NM	02	1036.5	13.1		10	16.5	05	8	26
JCXW	12	46.0 N	154.9 W	00	32	25	5 NM		1014.3	6.5	9.0	8	10	31	10	32.5
WVHS	12	45.2 N	124.8 W	00	20	M 45	2 NM	50	0991.0	10.6	9.4	6	16.5	18	12	26
GPGV	12	48.1 N	152.7 W	18	30	M 49	5 NM	37	1005.0	2.7	7.0	6	8	31	11	14.5
PACIFIC	APR.															
JBMS	12	51.1 N	142.9 W	18	28	M 29	10 NM	23	0980.5	3.5	7.0	7	13	30	10	39
JCDK	12	49.5 N	155.9 W	18	31	M 51	10 NM	03	1008.5	2.5		2	8	34	9	24.5
WPIY	13	34.5 N	121.1 W	00	20	08	10 NM	01	1022.0	16.7	13.9	0	0	18	10	36
JCDK	13	48.3 N	152.1 W	06	32	M 41	5 NM	22	1008.5	1.5	4.5	3	8	33	10	32.5
JCID	13	38.8 N	158.4 W	06	31	M 76	5 NM	35	1027.3	12.0	12.5	3	6.5	32	6	8
WJGH	13	49.9 N	155.5 W	12	34	40	10 NM	02	1012.2	0.0	2.8	6	16.5	28	12	32.5
GRQV	13	47.0 N	144.7 W	18	31	M 38	2 NM	26	1002.8	2.0	7.0	6	23	33	9	26
D7GF	14	43.6 N	152.6 W	00	30	M 42	1 NM	24	1010.0	7.9	10.0	9	14.5	30	9	24.5
JCDK	14	47.6 N	146.6 W	00	30	M 41	10 NM	22	1008.7	2.0	6.0	3	8	31	90	29.5
WJGH	14	49.9 N	152.1 W	00	31	40	10 NM	02	1012.2	1.7	3.3	6	14.5	31	9	32.5
WPGJ	14	39.5 N	135.3 W	00	28	28	10 NM	80	1015.0	11.7	12.2	5	10	32	13	24.5
JCBK	14	47.6 N	145.8 W	03	31	M 26	2 NM	22	1008.5	3.0	6.0	3	6.5	33	9	29.5
EIDG	14	34.4 N	144.3 W	12	33	M 13	10 NM	15	1025.9	13.0		4	5	34	10	24.5
GNAC	15	37.5 N	143.1 W	00	32	M 13	5 NM	15	1026.7	11.5	13.5	2	1.5	34	13	36
WEZD	15	43.2 N	152.1 W	06	27	M 18	10 NM	02	1025.0	8.9	9.4	2	3	34	10	24.5
EWWL	15	37.5 N	141.7 E	18	14	52	2 NM	64	1002.2	5.6	13.0	12	18			
UKGF	15	37.0 N	144.0 E	18	19	M 62		07	1005.4	15.0	10.0	5	11.5			
VKAP	16	05.0 N	128.6 E	00	36	M 09	> 25 NM		1009.4	29.0		2	1.5	04	9	37.5
JFOD	16	54.0 N	145.9 W	18	25	M 34			0993.0	1.5	4.5	6	8	26	11	26
WFDP	16	53.3 N	134.5 W	18	25	60	10 NM	01	1004.5	7.8						
WIPL	16	56.3 N	156.6 W	18	25	M 50	10 NM	02	1003.5	- 7.2	1.7	4	13			
5LAH	17	54.0 N	142.5 W	00	26	M 50	5 NM	83	0998.0	1.5	6.0	9	23			
7JZA	17	53.9 N	139.6 W	06	26	M 35	2 NM	23	1001.0	1.5	6.5	4	6.5	27	8	29.5
WWND	17	51.6 N	134.1 W	12	27	38	10 NM	85	1012.5	4.4	5.5	7	16.5	27	9	24.5
5LAH	18	54.0 N	145.9 W	00	27	M 60	10 NM	02	1017.0	0.5	6.0	7	18			
K59K	18	40.0 N	125.0 W	18	36	M 32	10 NM	02	1030.9	9.4	8.9	3	6.5	35	7	24.5
H3WN	19	54.0 N	142.9 W	00	15	64										
KAAV	19	50.7 N	158.7 W	00	01	55	.5 NM	86	1004.3	3.3	3.9	8	11.5	02	10	14.5
KSFJ	19	39.8 N	125.6 W	06	33	34	5 NM	02	1027.0	9.4	10.6	11	24.5	35	12	32.5
JCZF	19	53.4 N	155.7 W	18	34	M 49	200 YD	45	0994.5	1.5	7.5	11	23	34	11	23
UNNJ	19	54.4 N	134.7 W	18	16	M 56	.5 NM	99								
UNWI	19	53.9 N	154.8 W	18	34	M 48	200 YD	75	0987.7	- 3.0	4.0	8	19.5			
JFMT	20	54.1 N	155.2 W	00	33	M 48	.25 NM	73	0980.5	0.0	1.0	8	11.5	30	13	28
JGXY	20	52.4 N	147.6 W	00	18	M 49	.5 NM	60	0976.5	9.0	4.0	6	13	19	8	23
KAAV	20	50.5 N	154.5 W	00	02	60	.5 NM	77	0995.2	3.3	3.9	10	23	33	14	32.5
OKMP	20	46.5 N	153.7 W	00	29	M 26	5 NM	02	1012.0	7.3	5.3	5	8	31	8	29.5
SMZC	20	54.1 N	143.9 W	06	27	M 60	2 NM	52	0995.0	9.5	5.0					
KGJX	20	54.1 N	160.1 W	06	33	M 55	5 NM	83	1002.0	- 2.2	4.0	3	6.5	31	10	14.5
S6CT	20	52.6 N	142.5 W	06	20	37	5 NM	60	1003.0	4.5		9	32.5	24	9	32.5
W6WP	20	56.1 N	139.5 W	06	14	M 42	5 NM		1004.1	3.9	4.4	10	26			
ELAH3	20	53.1 N	156.0 W	12	34	M 50			1002.0	0.0	4.0					
NCDF	20	57.4 N	141.5 W	18	17	M 40	5 NM		1001.8	3.7	4.4	6	23	20	15	29.5
WCIO	20	59.3 N	144.5 W	18	18	M 40	5 NM	25	0993.5		4.4	3	8	19	7	26
H3WN	21	53.2 N	156.7 W	00	31	M 70										
JGXY	21	53.4 N	148.4 W	00	26	M 24	2 NM	22	1006.8	2.0	4.0	6	13	29	9	24.5
KHLO	21	51.7 N	137.5 W	00	23	30	10 NM	07	1024.0	7.9	3.3	4	5	27	12	24.5
NGDF	21	57.2 N	143.3 W	00	19	M 35	5 NM		1004.7	5.0	0.6	3	11.5	26	10	24.5
UNWI	21	55.4 N	146.5 W	06	20	M 74	5 NM	22	1010.7	- 5.0	4.0	7	11.5			
LFEL	22	34.3 N	145.8 W	06	05	M 62	5 NM	60	1012.3	14.5		10	16.5			
3PNY	22	34.7 N	122.6 E	12	22	74	10 NM		1011.5	11.4						
GPOY	23	35.6 N	148.1 E	00	32	M 50	5 NM	25	1000.9	13.0	16.7	8	29.5	28	6	21
JPBO	23	42.5 N	146.1 W	00	36	71	10 NM	10								
WEZM	23	37.8 N	147.5 E	06	35	M 40	5 NM	02	1008.5	9.4	11.9	4	13	XX	6	32.5
JOZE	23	43.9 N	161.9 E	12	06	M 70	2 NM	68	1012.8	7.8	7.5					
JLBM	23	44.1 N	140.9 E	12	16	17	5 NM		1016.0					16	7	26
KNIJ	25	33.2 N	136.2 W	12	10	M 50	5 NM	55	1016.0	13.3	14.4			36	5	6.5
5LJT	27	52.7 N	171.1 E	00	29	M 20	5 NM		1024.0	1.0	1.0	8	8	08	29	57
KGBA	27	55.1 N	138.1 W	00	16	45	2 NM	91	0990.7	5.5	7.5	4	8	15	9	24.5
WNDM	27	56.6 N	141.0 W	00	15	M 48	5 NM	20	0984.0	7.8	7.2	11	23	16	7	13
NJDG	27	59.4 N	145.3 W	06	09	50	5 NM	02		3.9	5.6	8	13	09	12	39
UTIY	27	50.6 N	156.1 E	12	34	M 25	5 NM	01	1020.0		0.5	40	32.5			
JLBY	27	49.1 N	163.9 W	18	27	M 64	5 NM	60	1013.5	4.0	9.0	5	10	29	6	10
6ZQN	28	29.3 N	123.6 W	00	02	M 07	10 NM	03	1021.0	19.0	19.0	2	3	02	0	37.5
JRXZ	28	53.3 N	176.5 E	00	32	M 70	5 NM	20	1015.0							
BPCG	29	34.1 N	121.7 E	00	01	52			1017.7							
JCAK	29	45.3 N	136.4 W	18	23	M 20	5 NM	61	1020.0	9.0	7.0	5	5	26	8	42.5
JEFT	30	40.2 N	166.6 W	00	25	M 04	10 NM	02	1027.0	10.5	11.0	2	0	02	50	32.5
JMDD	30	35.6 N	154.9 W	00	01	M 69	.5 NM			15.5						

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C Air	Temperature °C Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
PACIFIC	MAY															
46020	1	55.9 N	168.0 W	00	01	M 51			1010.6		3.0					
ELXV	1	35.8 N	179.4 W	00	23	M 40	5 NM	01	1006.5	17.0	16.1	5	10	23	8	16.5
HSJB	1	20.1 N	121.9 E	00	24	39	5 NM		1010.9	28.5	28.3	4	5			
JPMY	1	37.5 N	171.2 E	00	32	M 35	10 NM	03	1011.0	11.5	14.5	7	10	34	9	13
KGJB	1	42.2 N	172.5 E	00	01	M 36			1005.0	10.0	10.0	8	10	06	8	11.5
VCPZ	1	53.7 N	130.5 W	00	13	45	2 NM									
WNDF	1	51.0 N	128.6 W	00	15	M 38	2 NM	52	1009.0	7.8	9.5	5	8	15	6	11.5
JBPY	1	39.5 N	171.5 E	03	32	43	1 NM		1007.5	11.0	14.0	8	23	34	8	13
JJKQ	1	42.2 N	175.8 E	03	01	M 52	1 NM	63	0996.2	7.0	13.0	5	10	07	8	26
BLHW	1	42.3 N	158.0 W	06	23	M 26	10 NM	03	1016.0	10.0	10.0	3	14.5	25	6	19.5
EWVY	1	32.0 N	173.1 E	06	29	39	> 25 NM		1016.8	17.0	17.2	6	13			
JDWH	1	41.4 N	171.2 E	06	32	M 41	2 NM	07	1012.0	9.0	11.0	4	10	04	8	16.5
KGSM	1	56.4 N	139.3 W	06	36	02	> 25 NM	15	1000.9	3.9	7.2			28	8	36
JOLY	1	43.1 N	171.7 E	09	36	42	10 NM		1015.5	8.0	6.0	3	5	06	8	10
WJAF	1	28.0 N	116.7 W	12	34	35		03	1013.0	15.6	18.3					
GCGS	1	36.9 N	169.5 W	18	22	M 36	2 NM			14.8						
JLHD	1	52.8 N	138.8 W	18	16	M 35	1 NM	61	0999.0	4.5	6.5	5	10			
JMVI	1	20.7 N	142.8 W	18	05	M 37	10 NM	21	1018.5	21.0	24.0	3	5	14	8	8
UTIX	1	50.6 N	156.2 E	18	17	M 41	2 NM	40	1018.2	3.0	1.5					
HPVK	1	41.2 N	176.3 W	23	10	M 20	2 NM	05	0998.0	13.0	10.0	6	6.5	18	16	19.5
46020	2	55.9 N	168.0 W	00	01	M 52			1018.7		2.9					
JJFS	2	33.7 N	174.4 E	00	33	29	5 NM		1018.0	15.5	17.0	6	10	36	11	19.5
JGLY	2	42.1 N	176.5 E	00	01	39	5 NM		1013.5	9.0	7.0	4	6.5	04	12	16.5
OWEC	2	31.2 N	178.8 W	00	29	M 40	> 25 NM	02	1010.9	20.0	18.0	6	13	28	11	19.5
WNDF	2	54.0 N	138.0 W	00	13	M 35	1 NM	59	0994.9	5.2	8.0	5	18	18	14	14.5
ZCKU	2	37.2 N	171.5 E	00	03	M 20	5 NM	02	1019.7	11.0	16.5	4	5	34	6	19.5
8KXF	2	48.8 N	143.9 W	06	28	35	10 NM		1003.5	5.0						
C6CE	2	34.7 N	144.5 E	06	18	M 35	5 NM	02	1010.8	20.0		3	10	19	6	13
KHJB	2	50.7 N	129.6 W	06	19	M 35			1010.9	6.4	8.9	3	5	27	6	6.5
KNFD	2	56.4 N	139.6 W	06	09	M 35	10 NM		0993.9	3.3	6.1					
PCPN	2	37.7 N	175.5 W	06	27	M 37	5 NM	15	0993.2	14.0	14.6	8	19.5			
WFGE	2	48.2 N	132.9 W	06	19	M 35	5 NM		1008.6	7.4	6.1	6	16.5	27	6	13
JETO	2	20.2 N	147.5 E	12	02	M 65			1015.0		27.0					
JDWH	2	37.3 N	177.1 W	18	34	M 40	2 NM	60	1008.0	11.0	16.0	6	11.5	34	12	21
KHRK	2	0.2 N	177.9 E	18	04	M 35	5 NM	02	1019.5		12.0	5	6.5	03	8	16.5
HPVK	2	40.4 N	179.6 E	23	02	M 21	2 NM	05	1020.0	9.0	9.0	10	10	07	16	23
6ZFW	3	49.9 N	139.5 W	00	27	35	10 NM	01	1010.0	8.2	5.8	7	13	27	7	13
ABFO	3	44.9 N	172.2 W	00	05	M 35	10 NM	15	1014.0	8.0		9	14.5	05	10	14.5
ATAL	3	33.4 N	167.9 W	00	25	M 40	10 NM	03	1007.5	18.0						
DSZX	3	52.5 N	135.4 W	00	25	M 40	2 NM	60	1001.0							
JFQU	3	40.7 N	151.1 E	00	18	M 35	200 YD	63	1008.5	12.0	8.0	5	5	22	10	11.5
OWEC	3	30.3 N	174.5 E	00	01	M 16	> 25 NM	02	1021.0	18.0		6	10	01	11	19.5
46020	3	55.9 N	168.0 W	03	01	M 79			1014.9	3.0	3.0					
7JNU	3	34.7 N	166.0 W	06	26	31	2 NM		1005.9	16.5		6	10	35	10	19.5
BLHW	3	33.3 N	169.0 W	06	26	M 24	5 NM	01	1009.0	18.0	17.0	3	11.5	28	6	23
JCDK	3	49.4 N	168.7 E	06	22	M 37	.25 NM		1007.5	8.0		2	3			
JPRM	3	41.9 N	171.5 W	06	02	40	1 NM			7.5	10.0	5	6.5	36	8	14.5
JOLY	3	40.0 N	173.5 W	06	34	M 26	2 NM	15	1010.0	10.0	7.0	3	5	03	9	21
WJAF	3	51.3 N	138.0 W	06	28	40	5 NM	02	1009.0	5.6	7.2	4	11.5	28	6	11.5
WNEJ	3	38.1 N	123.9 W	06	32	M 36	10 NM	01	1016.0	11.0	10.0	3	5	32	5	8
JFYR	3	30.3 N	126.1 W	18	35	57	10 NM									
KLHP	3	41.4 N	154.8 W	18	17	35	2 NM	53	1006.0	12.2	8.9	3	10	19	4	13
KPIV	3	46.2 N	166.6 W	18	02	40	5 NM	02	1005.4	4.4	8.9	8	10	05	12	14.5
NMMJ	3	52.4 N	176.9 W	18	18	M 35	1 NM	51	1002.5	4.5	2.8	7	6.5			
S6GY	3	46.4 N	165.8 W	18	02	39	5 NM		1005.0	4.0	4.0	6	11.5	09	8	14.5
HPVK	3	39.7 N	173.3 E	23	26	M 15	5 NM	02	1023.0	14.0		6	6.5	08	16	19.5
KACK	3	52.4 N	134.4 W	23	24	35	5 NM	01	1019.5	7.7	8.4	6	14.5	24	8	13
9VRQ	4	00.3 N	139.1 E	00	24	M 35	5 NM	64	1011.1	26.9		3	5	25	4	10
EWVY	4	35.4 N	171.5 E	00	25	78	> 25 NM		1023.2	14.2						
JFQD	4	39.2 N	154.6 E	00	22	M 35	.5 NM	05	1011.5	16.5	11.2	6	16.5	23	9	13
JIRP	4	49.2 N	146.5 W	00	13	M 40	50 YD		1016.5	6.0	6.0	6	13	13	6	11.5
KGJR	4	35.5 N	141.7 E	00	22	M 35	5 NM	02	1005.5	21.5	22.0	5	8	22	7	10
KPIV	4	45.1 N	165.6 W	00	36	40	5 NM	15	1003.9	3.0	8.9	10	11.5	03	12	18
3FYC	4	49.6 N	178.2 W	06	15	35	.5 NM		1008.0							
9VYT	4	41.3 N	124.7 W	06	35	M 47	5 NM	02	1020.5	10.0	18.0	7	5	33	13	13
H3ND	4	50.1 N	179.8 W	06	20	M 27	.25 NM	46	1005.0	6.0	4.5	7	19.5	19	9	21
JKFS	4	45.8 N	165.3 W	06	33	M 30	5 NM	02	1006.0	6.0	7.0	2	3	01	7	19.5
PHQK	4	52.3 N	151.1 W	06	09	M 36	2 NM	61	1010.5	0.8	6.0					
WFGE	4	38.0 N	124.0 W	06	36	M 48	10 NM			11.1						
KHRW	4	39.1 N	125.1 W	12	36	M 50	10 NM	02	1015.2	11.0	11.0	6	13	27	8	8
KNIJ	4	36.7 N	126.4 W	12	32	35	10 NM	01	1017.8	11.7	13.3	4	6.5	31	36	6.5
3EYN	4	51.9 N	154.7 W	18	05	M 42	5 NM	02	1003.5	3.5	6.0	5	5	05	6	8
KEOD	4	38.6 N	128.0 W	18	04	40	5 NM	02	1025.0	12.8	12.2	4	19.5	29	6	14.5
KLHP	4	43.1 N	165.3 W	18	31	35	2 NM	50	1012.0	6.7	6.1	3	10	32	5	14.5
SFAN	4	37.5 N	128.2 W	18	35	35	10 NM	02	1021.8	14.5	18.0	XX	16.5	--	XX	70
WUBV	4	52.1 N	157.0 W	18	03	35	10 NM	18	1007.2	4.4	2.2	1	6.5	07	7	13
46020	4	55.9 N	168.0 W	21	01	M 54			1010.8	3.0	3.0					
HPVK	4	38.8 N	167.1 E	23	26	M 26	2 NM	50	1010.0	15.0	11.0	12	16.5	26	18	23
46020	5	55.9 N	168.0 W	00	01	M 56			1009.9	3.0	3.0					
BPKD	5	34.7 N	122.7 E	00	01	62										

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C Air	Temperature °C Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
PACIFIC	MAY															
GYEQ	5	33.9 N	176.3 W	00	00	00	10 NM		1021.2	16.1	15.0	0	0	34	7	19.5
JJAD	5	40.9 N	163.8 E	00	27	M 35	2 NM	21	1000.6	14.0	11.0	3	5	26	7	11.5
KAAC	5	53.3 N	136.1 W	00	17	M 38	2 NM	63	1020.8	5.5	6.2	5	16.5	17	6	19.5
KEOD	5	38.3 N	126.1 W	00	36	40	10 NM	02	1017.9	12.8	10.6	2	14.5	05	10	14.5
KNFD	5	57.2 N	140.7 W	00	10	M 38	10 NM	02	1017.8	5.2	4.4	5	8			
LIBD	5	38.0 N	179.2 E	00	23	M 15	> 25 NM	02	1022.5	16.2	16.0	3	3	04	8	19.5
SFAN	5	37.5 N	129.6 W	00	35	35	10 NM	02	1023.0	13.0		XX	16.5	--	XX	70
LJKP	5	34.4 N	168.0 E	06	27	M 17	10 NM	01	1001.9	20.1	11.1	10	21	27	5	19.5
NGDF	5	55.3 N	172.3 W	06	15	M 35	5 NM		1002.3	6.2	4.4	4	14.5			
UONV	5	41.4 N	124.5 W	06	34	35	10 NM		1018.8	10.4	10.4	8	18			
WNDF	5	58.2 N	148.8 W	06	05	M 40	5 NM	01	1011.0	2.8	5.0	3	13	05	4	19.5
KGJF	5	42.9 N	138.9 W	12	17	M 36	10 NM	02	1025.0	11.0	9.0	4	10			
WIPL	5	58.4 N	151.0 W	12	05	M 40	5 NM		1009.0	4.4	4.4					
7LSP	5	46.6 N	151.0 W	18	28	M 35			1013.5	7.0	7.0	5	6.5	26	7	11.5
JRYS	5	13.1 N	146.1 W	18	09	M 37	2 NM	62	1011.5	24.5	26.5	5	5	07	9	10
KPJC	5	58.0 N	149.6 W	18	06	M 30	2 NM		1002.1	5.0	5.0	7	8	09	XX	23
NJDG	5	41.8 N	126.8 W	18	01	35	5 NM	02	1025.0	11.7	10.0	2	6.5	36	8	13
GWOL	6	30.7 N	131.0 W	00	36	12	10 NM		1021.9	17.0	16.2	5	5	01	10	19.5
JCBM	6	32.9 N	173.5 W	00	14	M 07	10 NM		1020.0		17.0	3	3	04	0	44
NODX	6	58.2 N	151.2 W	00	04	M 35	1 NM	63		9.5	5.0	3	8	13	6	11.5
46020	6	55.9 N	168.0 W	03	01	M 38			1004.9	3.0	3.0					
JKLB	6	50.3 N	137.9 W	12	25	M 22	2 NM	50	1021.0	7.0	6.0	6	19.5	27	7	19.5
JKXM	6	43.1 N	171.2 W	12	19	M 38	1 NM	07	1004.3	11.0	10.5	7	10	23	8	11.5
JPRM	6	39.5 N	159.8 E	12	29	35	5 NM		1011.0	11.0	12.0					
KPJC	6	54.5 N	142.1 W	18	26	M 28	10 NM	01	1017.6	4.4	10.0	7	14.5	22	7	19.5
WNEJ	6	40.6 N	126.1 W	18	33	M 35			1022.0	13.0	7.2	4	5	33	6	10
3FYC	7	49.2 N	158.6 W	00	14	35	1 NM	80	1017.0							
JREL	7	44.3 N	161.2 W	00	18	35	10 NM		1023.0	12.0	8.0	5	11.5	18	7	10
KGBA	7	54.7 N	139.0 W	00	28	35	10 NM	02	1019.6	7.7	6.6	3	5	28	5	11.5
7LSP	7	48.6 N	161.6 W	06	16	M 35	.25 NM	07	1013.0	7.5	6.0	4	8	22	8	14.5
UMKG	7	44.9 N	147.7 E	06	14	58	2 NM	65	1005.3	6.5						
JPRM	7	37.3 N	151.5 E	12	10	M 37	.5 NM	53	1010.0	14.0	14.0					
46020	7	55.9 N	168.0 W	18	36	M 38			1001.9	2.2	3.0					
HPWV	7	33.9 N	155.2 E	18	22	M 25	5 NM	61	1012.5	18.0	18.0	6	5	22	0	41
WHNG	7	39.6 N	124.5 W	18	35	M 35	10 NM	01	1020.1	11.0		5	6.5	35	7	10
HPVK	7	35.9 N	150.8 E	23	34	M 31			1012.0	20.0	15.0	12	16.5	34	14	19.5
JCVS	8	46.8 N	165.8 W	00	16	M 36	200 YD	52	1007.8	8.0	6.0	5	6.5	17	7	10
WHNG	8	38.3 N	123.8 W	00	34	M 38	5 NM	00	1013.9	11.1		5	5	34	7	10
WNDM	8	40.6 N	126.0 W	00	35	M 45	10 NM	02	1021.0	12.0	12.2	8	14.5	36	8	14.5
BPGV	8	35.2 N	122.7 E	06	01	64										
BPRF	8	33.0 N	132.1 E	06	18	78	5 NM		1014.2	20.4	19.1					
46020	8	55.9 N	168.0 W	18	01	M 56			0991.1	3.4	3.8					
WCIO	8	53.1 N	137.6 W	18	27	M 08			1021.4	6.1	5.6	2	1.5	27	7	21
WJZG	8	36.8 N	124.8 W	18	34	40	10 NM	02	1016.0	11.7	12.2	4	11.5	34	8	18
WSVR	8	43.0 N	127.6 W	18	34	35	10 NM	01	1019.8	9.4	9.4	6	13	34	6	13
KAAV	9	49.4 N	127.2 W	00	32	35	10 NM		1017.9	8.3	9.4	6	6.5	32	9	8
WNDM	9	45.9 N	130.6 W	00	32	M 40	10 NM	88	1022.5	10.0	11.7	5	6.5			
BTBM	9	33.4 N	122.6 E	06	01	78										
KHRH	9	54.2 N	178.3 W	06	35	M 43	5 NM	25	0999.0	2.5	4.0	6	13	03	8	8
ONMN	9	37.9 N	123.3 W	06	30	M 36	5 NM	02	1009.5	9.2	9.2			31	6	23
WEZM	9	39.3 N	125.0 W	06	33	M 40	10 NM	02	1012.5	10.6	10.0	1	10	33	6	21
BPGX	9	32.0 N	122.5 E	12	01	62										
KLHZ	9	38.8 N	124.3 W	18	34	M 35	5 NM	02	1015.5	11.7		7	10	33	6	10
46020	9	55.9 N	168.0 W	21	01	M 73			0990.3	3.4	3.4					
DSFU	10	53.8 N	176.3 W	00	29	M 35	10 NM	03	1004.5	5.0	7.0	5	5	29	6	10
46020	10	55.9 N	168.0 W	06	01	M 71			0995.0	2.2	3.4					
SLJT	10	54.4 N	165.6 W	18	25	M 35	10 NM		1010.0	1.0	1.0	10	6.5			
9VYT	10	54.4 N	166.3 W	18	24	M 38	5 NM	15	1004.0	3.5		7	5	27	10	8
DSFU	11	53.4 N	175.5 E	00	28	M 43	5 NM		1001.4	5.0	7.0	6	6.5	27	6	10
JPVO	11	53.0 N	178.0 E	00	28	35	5 NM		1016.0	4.0	4.0	6	10	33	12	16.5
WJGM	11	53.9 N	174.6 W	03	30	M 47	5 NM	15	1009.8	4.4	2.7	6	8	32	0	11.5
JLSO	11	19.0 N	123.1 E	09	16	M 19	10 NM	02	1013.5	31.0	29.5	1	1.5	16	20	32.5
H9EV	11	54.4 N	165.7 W	18	25	M 37	2 NM	26	1008.0							
WFGE	11	11.5 N	89.3 W	18	10	M 35	10 NM		1005.0	31.1	31.1	4	10			
EWVU	12	43.2 N	155.2 E	18	28	41	10 NM		0995.1	5.0		5	8			
H9EV	12	54.0 N	173.5 W	18	24	M 37	5 NM	02	1016.0							
USRN	12	51.2 N	157.5 E	18	05	M 35	.25 NM	73	0991.7	1.0		7	13	08	12	10
7LSP	13	45.6 N	154.9 E	00	30	M 45			0991.5	3.5	3.5	4	10	30	6	26
8KQO	13	45.2 N	153.4 E	00	30	M 32			0999.0	3.0	3.0	6	13	29	10	19.5
EVBV	13	47.0 N	152.2 E	00	34	43	10 NM		0993.5	1.5	3.0	8	11.5			
H9EV	13	53.9 N	175.6 W	00	29	M 37	10 NM		1021.0							
J6JB	13	45.8 N	165.7 E	00	17	M 48	1 NM	63	0999.5	7.0	4.0	6	8	20	10	10
JODK	13	45.1 N	157.9 E	00	26	M 38	5 NM	07	0988.0	4.0	2.0	3	5	25	8	10
JOTM	13	38.9 N	160.2 E	00	22	M 38	2 NM	51	1007.2	15.5	16.5	7	8	21	9	11.5
KHRP	13	49.7 N	166.4 E	00	14	M 37	2 NM	63	0995.1	6.0	3.0	6	6.5	16	11	10
UGRS	13	49.0 N	151.3 E	00	34	M 37	5 NM	60	0999.4	2.1	2.3	7	8	08	16	10
UIAR	13	46.9 N	152.2 E	00	34	39	10 NM		0995.7	1.5	3.0	6	6.5			
ULKK	13	54.0 N	161.4 E	00	07	M 35	< 50 YD	73	1000.4	0.3		5	13			
UYDA	13	46.9 N	152.0 E	00	33	39	5 NM		1002.9	3.0	2.0	8	11.5			
WJGM	13	49.0 N	164.1 E	00	14	M 40	.25 NM	80	0992.0	4.4	2.8	6	8	14	8	13

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C. Air	Temperature °C. Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
PACIFIC	MAY															
3ERV	13	38.7 N	163.6 E	03	19	M 35	5 NM	60	1007.0	15.0	15.5					
LVAL	13	47.1 N	152.4 E	06	34	39	10 NM		0999.3	0.9	3.0	10	13			
46020	13	55.9 N	168.0 W	09	01	M 52			1012.4	1.4	3.0					
JKLA	13	49.9 N	166.4 E	11	30	M 27	1 NM	05	0992.0	6.4	4.0	14	19.5	18	42	14.5
JPVO	13	47.2 N	158.4 E	12	30	42	2 NM		0989.0	2.5	3.0					
ZSWS	13	32.0 N	133.5 E	12	02	M 36		01	1010.4			2	5	21	5	3
JPQC	13	36.4 N	142.3 E	15	22	M 36	5 NM	03	1004.0	20.0	18.0	6	13	16	7	10
ABWA	13	37.5 N	144.5 E	18	22	M 41	5 NM	03	1000.0	21.0	20.0	5	6.5			
OXIT	13	47.3 N	160.3 E	18	29	35	5 NM	02	0996.5	2.8		XX	14.5			
ZCSN	13	35.7 N	142.3 E	18	22	35	10 NM		1002.8	22.7	18.2					
5MPK	13	35.3 N	140.5 E	23	23	M 38	50 YD	44	0999.0	20.0	17.0	9	6.5	23	5	3
9VYT	14	47.7 N	161.1 E	00	26	M 35	5 NM	15	0996.0	3.8	9.0	6	6.5	27	10	11.5
BPJV	14	28.7 N	121.9 E	00	04	M 35	5 NM	00	1018.5	15.4						
EWAH	14	41.6 N	140.6 E	00	31	M 41	5 NM		1000.3	8.0	5.0	4	5			
P3VF	14	36.2 N	149.4 E	00	22	40	2 NM	05	1006.5	23.0	22.0	6	10	22	6	8
H9EV	14	53.3 N	174.0 E	06	11	M 35	.5 NM	10	1011.0							
46020	14	55.9 N	168.0 W	21	36	M 62			1023.3	1.8	3.4					
ERUO	15	37.7 N	141.4 E	00	01	74	10 NM		1016.8		9.5					
H9EV	15	52.4 N	169.1 E	00	11	M 35	2 NM	10	1002.0							
JRXN	15	45.0 N	172.2 E	03	22	M 40	.5 NM	61	0998.0	9.5	6.5	6	10	20	10	13
DSNW	15	46.1 N	173.9 E	06	19	M 36	2 NM	05	0996.7	10.0	4.0	6	6.5	26	6	5
JDZA	15	42.0 N	176.5 E	06	19	M 35	1 NM	62	1011.0	11.0	16.0	5	8	30	10	13
KAAV	15	53.4 N	175.5 E	06	14	30	1 NM		0999.4	8.3	3.9	5	5	14	10	23
46020	15	55.9 N	168.0 W	12	01	M 69			1022.5	2.2	3.0					
JERS	15	49.9 N	173.4 E	12	26	M 52	.5 NM	61	0984.5	4.5	5.0	10	24.5	25	8	19.5
KGJF	15	47.6 N	178.3 W	12	19	M 35	1 NM	81	1006.0	7.5	5.0	19	13	19	4	13
NMDF	15	41.9 N	125.8 W	12	02	55	5 NM	02	1019.2	12.8	12.2					
UTUI	15	54.4 N	179.5 W	12	13	39	5 NM		1005.3	4.1	5.0	7	13	13	8	11.5
DVEL	15	53.0 N	171.8 E	18	28	M 40	1 NM	07	0998.8	3.0	4.0	2	16.5	28	5	3
LHUK	15	54.2 N	177.2 W	18	12	M 40	.5 NM	64	1009.0	4.0						
WSNB	15	50.7 N	129.7 W	18	16	35	10 NM	02	1009.8	11.1	8.3	5	10	16	6	8
ELVA	15	51.6 N	174.9 W	23	23	M 30			0999.9	6.0	0.5	12	26	24	10	26
46020	16	55.9 N	168.0 W	00	01	M 65			1013.7	3.0	3.4					
BPFO	16	33.6 N	122.7 E	00	01	58										
JCAK	16	52.4 N	169.7 E	00	27	M 38	5 NM	01	0988.5	4.0	3.0	8	11.5	26	10	16.5
JERS	16	49.2 N	170.3 E	00	25	M 40			1001.0	5.5	5.0	10	19.5	26	7	19.5
JGUS	16	51.0 N	169.1 W	00	13	M 36	2 NM	61	1009.9	5.5	5.5	6	13	18	8	13
JMIN	16	53.1 N	176.4 E	00	26	35	2 NM		0985.5	5.0	5.5	6	8	23	7	11.5
UIWH	16	53.9 N	167.7 W	00	28	35	10 NM	03	1019.9	5.5	4.2	6	10			
WNDM	16	45.6 N	130.4 W	00	15	M 40	10 NM	02	1016.0	12.2	11.8	5	6.5			
WSNB	16	51.4 N	130.7 W	00	16	35	10 NM	02	1001.2	11.1	8.3	7	11.5	16	6	11.5
3EED	16	54.6 N	171.2 W	06	16	M 50	1 NM	53	1002.0	4.0	4.0	10	16.5	15	10	16.5
8KWS	16	53.6 N	177.5 E	06	22	40	2 NM		0987.1	4.0	4.5	10	26			
DVEL	16	52.0 N	167.1 E	06	27	M 45	2 NM	07	0999.3	4.0	4.0	2	16.5	28	5	3
H9EV	16	49.9 N	160.9 E	06	26	M 35			1004.0							
JLNO	16	50.7 N	179.7 E	06	23	M 35	2 NM	05	0999.5	5.5	3.0	6	16.5	25	10	16.5
JPND	16	53.8 N	174.1 E	06	23	43	1 NM		0982.0	4.5	3.0	6	11.5	25	8	10
KAAV	16	52.2 N	166.0 E	06	28	35	2 NM		0992.0	1.9	3.3	5	5	28	9	24.5
LIG7	16	46.4 N	138.8 W	06	26	M 39	1 NM	62	0997.5	7.0		XX	16.5			
ONMR	16	49.4 N	139.0 W	06	02	M 39			0995.7	6.4						
WNDF	16	51.3 N	132.9 W	06	12	M 35	2 NM	63	1008.5	7.2	8.0	4	8			
WTES	16	58.5 N	174.0 W	06	10	M 36	5 NM	61	1001.0	1.3	- 1.1	4	16.5	13	6	16.5
NMMJ	16	53.9 N	165.1 W	06	15	M 38	5 NM	03	1013.0	3.9	3.3	5	8			
JIRP	16	49.2 N	162.0 E	09	28	M 36	5 NM	02	1002.7	3.5	4.5	6	13	27	7	16.5
LHUK	16	53.9 N	177.8 E	12	17	M 42	.5 NM	80	0987.5	4.0						
WTDL	16	54.8 N	166.2 W	12	13	M 37			1005.2	3.4		8	13			
ABWA	16	46.7 N	167.0 E	18	28	M 35	10 NM	03	1016.5	7.0	4.0	6	6.5	28	12	10
EUDU	16	54.3 N	163.3 E	18	02	23	10 NM		1010.2	1.0	3.0	6	19.5			
GQAR	16	47.9 N	131.7 W	18	22	37	5 NM		1015.9	8.5	9.5	4	5	25	11	10
JCJE	16	52.8 N	160.2 W	18	17	M 35	200 YD	63	1010.5	3.5	3.0	6	11.5	28	9	16.5
ELVA	16	50.8 N	179.9 E	23	23	M 39	5 NM	00	0999.2	6.0	0.4	12	23	23	14	23
DSAN	17	50.3 N	177.4 E	00	25	M 37	2 NM		0992.5	7.0						
ELRT	17	53.0 N	176.5 E	00	21	M 35	5 NM	25	0999.5	3.0	4.0					
JCAK	17	50.6 N	165.1 E	00	32	M 27	5 NM	01	1014.0	3.0	3.5	8	10	32	10	19.5
JLNO	17	50.1 N	176.2 E	00	25	M 40	5 NM	01	0993.0	5.0	5.0	6	16.5	24	10	16.5
KAAV	17	49.8 N	162.4 E	00	31	20	10 NM	01	1016.1	3.9	2.8	6	5	25	7	23
UOVN	17	50.5 N	167.7 E	00	29	M 35	5 NM		1009.7	4.0	6.0	9	11.5			
WWND	17	51.3 N	133.9 W	00	18	35	2 NM	18	0993.0	10.6	6.1	6	13	18	10	16.5
JBKR	17	48.2 N	173.6 E	06	28	38	5 NM		1009.0	7.0	7.0	5	8	28	8	11.5
8KWS	17	53.0 N	171.6 E	06	30	M 38	2 NM	15	1001.5	4.0	5.0	6	16.5	34	10	18
ABWA	17	47.5 N	170.5 E	06	28	M 37	10 NM	03	1018.0	7.0	4.0	6	6.5	30	13	10
HOVS	17	52.4 N	139.0 W	06	31	M 36	.25 NM	18	1011.5	12.0	4.0	9	13	31	8	11.5
JPND	17	52.3 N	170.6 E	06	32	37			1008.5	3.0	3.0	8	11.5	32	9	11.5
OUIU	17	49.7 N	176.2 E	06	28	M 40	5 NM	02	1009.0	5.6	4.0	6	6.5	28	14	13
S6CT	17	46.9 N	175.6 W	06	27	M 36	10 NM	01	1008.5	7.0	6.0	4	6.5	26	7	6.5
UTUI	17	52.7 N	170.2 E	06	33	39	2 NM		1003.6	2.0	4.5	11	16.5	33	11	16.5
GQAR	17	47.3 N	135.0 W	12	27	35	5 NM		1018.4	7.1	7.5	4	5	27	10	8
LHUK	17	52.8 N	171.2 E	12	32	M 35	5 NM	07	1011.0	3.0						
WKJO	17	33.0 N	121.9 W	12	30	35	10 NM	02	1013.0	14.4	13.3	4	5	30	7	11.5
WPGE	17	48.8 N	175.4 W	12	25	38	5 NM	21	1002.9	5.4	3.3	5	14.5	27	8	19.5

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C. Air	Temperature °C. Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
PACIFIC	MAY															
3EED	17	53.4 N	172.9 E	18	33	M 43	5 NM	50	1012.0	2.5	4.0	6	10	30	10	16.5
ELCJ	17	47.1 N	174.4 E	18	31	M 22	2 NM	50	1020.5	4.0	8.0	4	10	31	9	19.5
GXYM	17	48.1 N	177.9 W	18	30	M 37	10 NM	15	1009.0	5.0	4.5	3	10	29	8	13
JKZL	17	51.7 N	141.9 W	18	24	M 22	2 NM	21	1015.0	4.5	8.0	5	16.5	04	10	24.5
WSDX	17	47.4 N	130.4 W	18	29	25	10 NM	02	1018.5	8.3	13.0	4	5	28	10	19.5
A8UH	18	50.6 N	132.4 W	00	30	M 40	10 NM		1016.6	10.0	8.0	7	10	27	8	8
S6CT	18	47.1 N	167.7 W	00	26	M 35	10 NM	03	1012.0	6.0	6.4	3	6.5	29	6	6.5
DSHD	18	38.2 N	166.0 E	03	19	M 39	1 NM	56	1012.6	16.0	14.0	7	10	19	8	11.5
JBKR	18	49.5 N	179.0 W	03	29	M 35	5 NM	20	1012.0	7.0	7.0	6	11.5	29	8	13
JDWH	18	41.9 N	173.8 W	06	29	M 26			1024.5	11.0	13.0	6	13	29	10	19.5
JLLM	18	12.5 N	127.5 E	06	07	M 35	10 NM	60	1000.3	28.0	28.5	5	6.5	09	10	13
KHRF	18	34.2 N	125.2 W	06	34	40	5 NM	02	1018.2	13.5	13.0	3	6.5	34	4	11.5
WPGE	18	48.8 N	165.4 W	06	25	35	5 NM	15	1004.7	6.1	2.8	5	10	25	10	18
WSDX	18	50.0 N	132.8 W	06	30	26	10 NM	01	1018.5	8.3	13.0	4	6.5	28	10	19.5
46020	18	55.9 N	168.0 W	09	36	M 77			0999.8	2.2	3.4					
C2DG	18	37.9 N	124.0 W	12	31	40	5 NM	03	1015.0	11.0	10.0	8	13	33	9	13
WKJO	18	30.2 N	126.2 W	12	36	35	5 NM	02	1019.0	13.9	16.7	5	6.5	36	8	8
JIOP	19	36.1 N	125.2 W	00	35	M 30	10 NM	02	1019.5	13.0	13.0	5	8	35	14	21
UTUI	19	49.9 N	154.7 E	00	08	M 41	200 YD	45		1.8	4.5	10	11.5			
BPJO	19	37.4 N	122.8 E	06	34	35	10 NM		1007.0	15.4						
ESVM	19	49.5 N	154.7 E	06	08	35	.25 NM	43	1027.4	4.0	2.2	7	8			
46020	19	55.9 N	168.0 W	09	36	M 47			1007.4	0.3	3.4					
BPLK	19	36.5 N	122.7 E	12	01	45										
NJOV	19	42.2 N	125.0 W	12	33	35	10 NM	01	1020.0	9.4		4	6.5	35	8	8
UDMW	19	50.4 N	155.6 E	12	16	47	2 NM		1019.6	2.0		3	3			
GYZJ	19	15.7 N	128.0 E	18	17	M 50	5 NM	13	1005.5	28.9	28.5	5	8	19	12	19.5
JPXV	19	15.3 N	152.2 W	18	06	M 43	5 NM	03	1016.3	26.0	28.0	3	5	05	9	10
WNFJ	19	40.1 N	124.9 W	18	33	40	5 NM	02	1015.2	15.5		6	8	33	10	13
WWPI	19	42.5 N	172.3 W	18	20	30	1 NM	63	1007.1	12.2	10.0	6	8	30	12	19.5
BPKL	20	31.3 N	121.7 E	00	35	78	5 NM		1015.9	20.0						
BPNE	20	36.8 N	122.9 E	06	01	76										
GUBR	20	36.5 N	131.7 E	06	30	M 35	10 NM	03	1005.2	13.5	15.5	8	13	30	6	10
GWOL	20	36.2 N	131.2 E	06	30	37	10 NM		1006.0	13.0	15.1	6	16.5	28	7	13
HBNS	20	34.7 N	140.9 E	06	09	M 35				19.0		3	8	09	3	8
HOVS	20	51.5 N	173.5 W	06	31	M 36	1 NM	18	1016.4	5.0	1.0	6	10	31	6	11.5
BPJB	20	37.2 N	122.8 E	12	01	35										
ERUO	20	39.5 N	143.3 E	12	10	37	> 25 NM		1007.7	13.8	9.0	9	6.5			
JKRH	20	37.4 N	132.1 E	12	33	36	5 NM		1007.0					32	8	11.5
JRYP	20	36.2 N	143.2 E	12	11	M 44	2 NM	21	0997.5	19.0				13	10	14.5
46020	20	55.9 N	168.0 W	18	01	M 45			1006.1		3.4					
GUBX	20	10.3 N	121.5 E	18	21	M 35	10 NM	02	1007.7	28.0						
JPXV	20	17.2 N	157.1 W	18	07	M 58	10 NM	03	1017.5	25.0	27.5	4	8	06	9	11.5
WZJE	20	18.3 N	127.6 E	18	17	45	1 NM	65	0999.2		28.3	5	19.5	18	6	19.5
SMZH	21	45.5 N	173.1 W	00	05	M 45	10 NM	01	1016.0	10.0	6.0	5	8	05	5	8
OUIU	21	49.0 N	145.4 W	00	17	M 45	.5 NM	63	1000.0	8.0	6.5	5	5			
46020	21	55.9 N	168.0 W	03	36	M 48			1007.4	0.3	3.4					
JBOA	21	39.8 N	149.9 E	03	12	38	5 NM		1002.6	11.7	10.8	6	11.5	09	7	10
JQTM	21	36.1 N	129.2 W	03	34	M 17	10 NM	02	1023.8	19.5	16.0	2	3	31	7	23
JPXV	21	18.2 N	159.9 W	06	09	M 37	10 NM	03	1018.2	25.0	28.0	4	6.5	06	12	10
KLHZ	21	49.4 N	145.8 W	06	22	M 38	2 NM	60	0995.0	5.6		5	14.5	25	5	14.5
LHUK	21	41.9 N	145.2 E	06	11	M 36	.5 NM	27	1000.0		10.0	6	6.5	08	9	8
WZJE	21	18.8 N	125.6 E	06	28	44	2 NM	21	1002.3	27.2	27.2	5	16.5	31	6	18
WDZB	21	19.6 N	131.0 E	09	18	M 49	1 NM	62	1000.0	28.6	26.7	7	21	18	7	23
BPLK	21	38.7 N	120.6 E	12	01	37										
ERSN	21	40.9 N	144.9 E	12	01	45	10 NM		0997.7		12.7			20	4	3
LGPE	21	19.7 N	131.9 E	12	17	M 37	5 NM	02	1001.0							
ONMN	21	38.9 N	153.1 E	12	11	M 38	1 NM	62	1003.2	14.5	15.2					
ULPI	21	44.9 N	147.7 E	12	12	35	5 NM		1009.2	5.0	4.0					
3EED	21	39.2 N	144.9 E	18	30	M 35	5 NM	07	0998.0	11.0	6.0					
DSZU	21	52.2 N	139.0 W	18	24	M 40	5 NM	10	0998.8	7.5	3.0	4	8	25	5	11.5
GYEO	21	26.1 N	129.3 E	18	08	M 17	5 NM	61	1003.6	22.8	23.0	3	3	19	9	19.5
HOAA	21	53.4 N	144.9 W	18	29	M 45	5 NM	03		5.0	5.0	8	13	28	8	11.5
JFQU	21	54.3 N	144.0 W	18	29	M 32	5 NM	08		6.5	6.0	5	3	18	12	23
KGSP	21	57.0 N	140.3 W	18	14	38			0995.1	6.7	7.2	5	10	14	10	14.5
KHBA	21	39.5 N	124.4 W	18	33	35	10 NM	01	1015.0	14.5	10.6	9	11.5	33	10	14.5
KJDG	21	54.1 N	137.4 W	18	22	35	1 NM		0998.5	7.2	6.7	3	8	22	6	16.5
NJDG	21	53.1 N	137.4 W	18	22	35	1 NM		0998.5	7.2	6.7	3	8	22	6	16.5
OXDW	21	37.1 N	125.4 W	18	34	15	5 NM	02	1020.5	19.0	10.0	XX	19.5	25	26	23
WFDP	21	53.7 N	133.4 W	18	18	M 38	5 NM	02	1011.5	9.4						
WWND	21	52.9 N	135.6 W	18	16	45	2 NM	81	1002.0	7.2	5.6	12	10	15	15	14.5
3EPA	22	53.0 N	138.1 W	00	22	M 40	1 NM									
DSDW	22	21.5 N	133.6 E	00	25	M 43	2 NM	80	1002.0	26.5	28.0			24	17	24.5
DZGM	22	53.8 N	149.2 W	00	24	72										
GYEO	22	25.0 N	128.2 E	00	03	18	10 NM		1005.6	24.8	23.0	3	8	13	7	23
HBNS	22	34.7 N	157.2 E	00	20	M 41	10 NM	02	1009.0	20.0	17.5	4	6.5	19	4	6.5
JCZU	22	15.5 N	127.6 E	00	29	09	10 NM		1010.4	29.5	28.0	4	5	35	10	19.5
JDWT	22	41.9 N	160.9 E	00	10	M 36	5 NM	02	1021.5	8.0	11.0	4	6.5	10	7	16.5
KGJB	22	52.1 N	147.1 W	00	28	M 22	10 NM	02	1009.5	12.0	6.0	5	8	28	5	19.5
KPDH	22	42.3 N	155.0 E	00	12	39	2 NM	20	1008.0	7.8	8.3	4	6.5	12	6	14.5
VGPZ	22	53.5 N	131.8 W	00	14	43	5 NM	60	1008.5	8.5	9.0					

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C. Air	Temperature °C. Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
PACIFIC	MAY															
WFDP	22	54.0 N	136.1 W	00	19	M 40	5 NM	02	1001.6	10.0						
WWND	22	52.0 N	134.5 W	00	24	35	5 NM	02	1010.2	7.8	6.1	7	13	19	10	16.5
46020	22	55.9 N	168.0 W	03	36	M 58			1010.3		3.4					
3EOU	22	53.7 N	138.7 W	06	27	M 35			1004.5	6.0	7.0	9	10	27	9	10
ESKR	22	22.0 N	132.8 E	06	30	37	10 NM		1005.4	25.8	26.3	12	18			
JPRM	22	42.2 N	156.4 W	06	17	M 36	200 YD	65	1007.5	12.5	9.5	5	8	20	6	10
JPXV	22	19.9 N	165.0 W	06	08	M 37	5 NM	03	1018.3	26.0	28.5	3	5	06	12	8
KHPF	22	39.4 N	169.4 W	11	29	M 50	10 NM	02	1005.1	13.1	13.0					
UICC	22	49.3 N	162.7 W	12	10	41	2 NM	61	0990.0	3.5						
ULEY	22	48.5 N	149.3 E	12	09	37	10 NM		1013.8	1.5	3.0	6	8			
GNAR	22	45.6 N	173.5 W	18	34	M 27	5 NM	16	1014.0	4.5	6.0	6	8	34	7	19.5
JBUM	22	45.8 N	159.6 W	18	24	41	5 NM		0984.0	6.5	10.0	5	10	22	7	23
WNDD	22	53.4 N	135.5 W	18	21	M 12	10 NM	01	1018.8	7.2	7.2	XX	3	27	6	19.5
WNFJ	22	55.5 N	139.2 W	18	24	25	5 NM	02	1006.0	11.5	9.8	4	3	24	10	19.5
ZCSN	22	51.1 N	154.5 W	18	09	M 35	2 NM	63	0989.9	4.0	4.8	5	8	10	8	18
HPVK	22	39.9 N	168.6 E	23	11	M 29	2 NM	05	1021.0	14.0	9.0	10	13	11	14	19.5
46020	23	55.9 N	168.0 W	00	01	M 54			1007.9	0.3	3.4					
D5XP	23	22.9 N	143.1 E	00	30	M 19	10 NM	01	1011.4	25.6	26.5	4	10	27	14	36
ELCJ	23	47.2 N	144.2 W	00	19	M 42	.5 NM		1006.9	10.1		5	8	19	7	11.5
ERET	23	21.0 N	142.4 E	00	35	M 10	5 NM	80	1013.4	25.5	24.9	2	1.5	27	9	19.5
EWGF	23	41.6 N	124.5 W	00	33	39	5 NM		1018.6	11.8	11.6	4	6.5	34	9	13
JAVP	23	52.2 N	144.1 W	00	11	M 36	200 YD	53	1000.0	5.0	6.0	4	5	11	5	11.5
JCZU	23	20.3 N	128.8 E	00	09	09	10 NM		1012.5	26.5	24.5	4	6.5	02	11	21
JKZL	23	46.4 N	154.1 E	00	13	M 19	200 YD	61	1005.0	4.0	4.0	5	8	13	7	19.5
UIGC	23	48.1 N	161.4 W	00	35	31	5 NM	60	0991.8	3.5	2.1	9	19.5	01	8	11.5
JBUM	23	46.2 N	156.8 W	03	26	35	.5 NM		0995.5	6.5	9.0	4	8	24	7	23
H3AG	23	44.9 N	158.3 E	06	23	M 40	200 YD	47	1006.5	8.5	5.0	6	6.5	23	6	13
JBKP	23	50.8 N	135.7 W	06	14	M 40	2 NM	63	1011.0	6.5	9.0	6	8	26	6	11.5
JCVS	23	53.5 N	156.6 W	06	04	M 39	2 NM	61	0993.0	3.5	5.0	7	10	09	12	13
JCZF	23	50.0 N	135.1 W	06	18	M 35	2 NM	63	1013.5	9.5	7.5					
JFQU	23	53.9 N	159.0 W	06	03	M 41	5 NM	60	0996.5	5.5						
JPRM	23	41.9 N	146.9 W	06	20	M 37	2 NM	28	1016.0		10.2	30	54	21	7	11.5
JPZD	23	38.1 N	123.1 W	06	33	M 35	5 NM	07	1013.0	12.0	12.5	7	14.5	33	11	13
WJGC	23	54.9 N	140.7 W	06	13	M 38	2 NM	65	1003.0	4.4	6.7	4	6.5	13	5	19.5
WSIN	23	52.7 N	137.8 W	06	14	35	.25 NM	62	1007.0	6.7	6.1	6	8	14	8	10
WNEJ	23	55.1 N	136.9 W	12	13	M 50	5 NM		1001.5	9.0	6.1	3	14.5	14	4	16.5
GNAR	23	45.6 N	165.8 W	18	28	M 20	10 NM	15	1020.9	5.3	6.0	4	6.5	33	8	21
WHNG	23	40.0 N	125.0 W	18	35	M 32	5 NM	02	1016.3	10.9		5	13	35	9	21
WNDF	23	58.5 N	149.5 W	18	05	M 40	2 NM	53	0992.5	5.0	6.0	3	10	05	5	11.5
7JQI	24	54.0 N	144.7 W	00	20	M 38	.5 NM			6.0	6.0	9	16.5	19	9	16.5
HBNS	24	34.5 N	175.3 E	00	14	M 35	5 NM	14	1020.0	19.0	18.0	5	11.5	13	5	11.5
KSPY	24	41.9 N	127.3 W	00	02	40	10 NM	05	1022.3	16.0	12.0	4	5	03	6	11.5
UNYY	24	48.6 N	150.8 E	00	02	M 16	5 NM	02	1016.4	3.2		22	21			
UONV	24	41.4 N	124.0 W	00	34	41	10 NM		1016.6	11.2	10.1	10	16.5			
JJAD	24	54.0 N	142.0 W	03	21	M 41	2 NM	60	1007.5	6.5	6.0	6	13	21	9	16.5
KGSM	24	59.5 N	145.2 W	06	10	38	5 NM	02	0994.8	6.1	5.6	4	13	10	10	19.5
KHJR	24	55.2 N	139.1 W	06	20	M 36	2 NM	52	1003.3	7.1	7.8	4	6.5	23	7	10
KPIV	24	29.6 N	152.2 E	06	34	30	2 NM	10	1013.5	20.6	24.5	6	14.5	27	12	19.5
NNHB	24	41.2 N	125.2 W	06	36	M 36	5 NM		1015.2	12.2	10.6	3	5	35	4	11.5
WHNG	24	41.7 N	125.0 W	06	36	M 46	5 NM	02	1016.2	12.5						
GOTD	24	12.3 N	90.8 W	12	28	M 50	5 NM	61	1007.9	26.3	28.4	4	6.5	27	8	10
ONLB24	24	17.9 N	149.6 W	14	02	35			1010.0							
H3AU	24	37.8 N	176.1 W	18	21	M 27	1 NM	25	1010.0	16.0	12.0	5	19.5	18	9	19.5
H8LP	24	53.9 N	140.0 W	18	24	M 38	2 NM		1012.0	6.0	6.0	4	10	24	4	11.5
JFZG	24	39.7 N	137.8 W	18	33	M 39	10 NM	02	1032.2	16.5	14.5			27	10	3
JQWT	24	47.4 N	178.0 E	18	05	M 54	2 NM	63	0993.0	5.5	6.0	5	8	18	7	11.5
KACK	24	51.1 N	133.6 W	18	24	35	2 NM		1025.3	8.3	8.3	7	10	24	24	10
KGBA	24	54.4 N	136.4 W	18	23	25	5 NM		1014.5	7.7	7.2	4	6.5	23	8	19.5
OXPS	24	39.9 N	170.2 W	18	16	38	1 NM		1014.0	14.0	13.5	4	14.5			
WGKF	24	46.2 N	171.0 E	18	32	M 37	2 NM	15	1007.5	4.0	4.0	4	6.5	03	8	8
WSRH	24	34.8 N	131.0 W	18	02	35	5 NM	02	1019.0	16.1	16.1	4	8	04	7	11.5
46020	24	55.9 N	168.0 W	21	36	M 73			1011.4	3.8	3.4					
H8GC	24	50.5 N	171.9 W	23	04	M 44	200 YD	58	0994.0	7.0	3.5	6	10	09	6	10
46020	25	55.9 N	168.0 W	00	01	M 48			1011.2	4.2	3.8					
8KQM	25	49.3 N	170.0 W	00	12	M 36	.5 NM	51	0991.5	7.5	6.0	7	11.5	13	9	19.5
BPJS	25	34.2 N	122.8 E	00	16	48	10 NM		1013.5	19.6						
D7AH	25	53.9 N	141.6 W	00	25	M 36		02	1018.0	7.0	7.4	10	18	24	6	5
H3AU	25	37.6 N	174.3 W	00	23	M 25	1 NM	81	1007.7	17.0	13.0	5	18	23	7	21
JLRX	25	34.1 N	174.1 W	00	19	38	10 NM		1018.0	20.0						
KGBA	25	55.4 N	138.3 W	00	24	35	5 NM	25	1001.8	7.3	8.6	3	8	24	7	19.5
OXPS	25	39.9 N	167.5 W	00	18	35	1 NM	10	1014.8	14.5	13.0	7	13	22	12	18
WNDF	25	54.4 N	138.1 W	00	24	M 30	2 NM	41	1016.3	5.0	6.0	12	24.5			
WSRH	25	35.5 N	130.1 W	00	36	35	5 NM	02	1014.8	15.6	15.6	4	10	02	6	13
KRDH	25	51.4 N	166.2 W	05	12	40	5 NM	21	0997.5	5.0	6.7	3	6.5	12	6	10
H3WN	25	43.0 N	166.8 E	06	33	M 11	> 25 NM	02	1025.5	10.0	10.0	5	5	35	10	55.5
JCDT	25	49.4 N	177.6 W	06	35	M 38	10 NM	21	0991.5	5.5	4.5	3	6.5	05	12	13
NNHB	25	42.2 N	124.7 W	06	36	M 44	5 NM		1009.8	12.8	9.4	4	6.5	35	5	11.5
WGKF	25	46.2 N	176.9 E	06	33	M 42	5 NM	16	1006.0	5.0	5.0	6	10	35	7	13
BLHX	25	43.0 N	163.5 W	12	16	M 48	.5 NM	60	1004.0	11.5	10.0					
KGJX	25	47.0 N	164.1 W	12	17	M 40	1 NM	81	0996.0	8.3	6.0	7	13			

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C. Air	Temperature °C. Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
PACIFIC	MAY															
WGWB	25	40.7 N	125.9 W	12	36	35	5 NM		1011.9	12.2	11.0			36	8	16.5
WIPL	25	54.3 N	165.3 W	12	09	M 46	5 NM		1002.3	4.4	3.9					
EWGF	25	41.5 N	124.6 W	18	35	45	2 NM	07	1010.6	10.4	11.6	4	10	34	8	23
JQWT	25	48.1 N	176.5 W	18	33	M 50			0991.5	4.0	6.0	9	29.5			
KAAC	25	40.2 N	126.0 W	18	34	M 35	5 NM	02	1007.8	13.4	10.5	10	13	36	12	19.5
KIRF	25	39.7 N	130.3 W	18	01	40	10 NM	02	1021.0	12.5	12.8	7	16.5			
KPJC	25	43.2 N	127.7 W	18	36	M 35	5 NM	02	1023.9	11.1	10.6	3	6.5	36	7	13
KSPY	25	51.2 N	135.5 W	18	28	35	5 NM	02	1031.0	7.5	6.2	6	5	30	7	11.5
NGDF	25	47.7 N	179.7 W	18	34	M 42	5 NM		1004.4	4.8	6.1	6	13			
NYCO	25	56.4 N	168.9 W	18	06	35	2 NM	69		1.7	3.9	6	11.5			
OXZH	25	39.9 N	171.4 W	18	28	35	2 NM	82	1004.8	8.8		10	13			
USVV	25	55.5 N	163.0 E	18	02	M 10	200 YD	45	1014.3	2.5	3.5	3	5	29	0	49
WNFJ	25	57.2 N	142.2 W	18	05	15			1020.8	10.0	7.8	4	5	27	10	19.5
WNOM	25	41.6 N	127.2 W	18	36	M 45	5 NM	02	1016.9	12.5	12.2	10	16.5	36	8	6.5
WYBI	25	14.1 N	98.6 W	18	18	40	10 NM	16	1007.2	23.9		5	11.5	18	5	14.5
DSGO	26	47.7 N	161.1 W	00	17	M 38	.5 NM	63	0993.0	11.4		8	14.5	16	7	13
DZGM	26	54.2 N	176.3 W	00	02	68										
EWBT	26	41.9 N	124.7 W	00	35	43	10 NM		1009.7			14	18			
EWGF	26	41.5 N	124.6 W	00	34	52	2 NM	07	1009.4	10.2						
HPVK	26	40.4 N	171.1 W	00	31	M 35	2 NM	05	1010.0	1.1	8.0	12	23	31	14	23
JAVW	26	51.8 N	173.1 W	00	03	M 24	.25 NM	53	0984.5	5.0	4.0	5	6.5	17	0	44
JCVL	26	41.1 N	156.3 W	00	17	M 38			1016.5	13.5	12.5	5	8	18	9	14.5
JEMM	26	37.6 N	165.3 W	00	26	25	10 NM	02	1012.5	15.5	16.0	5	10	28	11	36
JQWT	26	47.8 N	174.4 W	00	31	M 39	.5 NM		0991.4	5.5						
KAAC	26	40.3 N	126.2 W	00	33	M 33			1013.0	11.2	10.8	8	19.5			
KIRF	26	39.3 N	128.0 W	00	01	40	10 NM	02	1015.5	12.2	12.2	7	16.5			
KPJC	26	42.2 N	126.8 W	00	36	M 42	5 NM	02	1019.0	13.4	11.7	6	10	01	9	16.5
WGKF	26	45.8 N	174.2 W	00	30	M 47			0993.0	8.0	6.0	5	11.5	32	7	13
WNFJ	26	56.2 N	140.7 W	00	30	15	5 NM	01	1027.1	9.4	7.8	4	5	27	10	19.5
8KQM	26	49.3 N	178.5 W	06	33	M 42	5 NM	02	1001.5	4.0	5.0	7	16.5	33	9	19.5
BPPY	26	34.8 N	122.6 E	06	13	35	10 NM		1013.7	18.2						
JCVS	26	53.8 N	178.7 W	06	35	M 37	5 NM	01	1003.2	4.5	4.5	5	8	03	10	11.5
NNHB	26	42.1 N	124.5 W	06	35	M 43	5 NM		1011.5		8.3	5	16.5			
SFMY	26	43.3 N	167.5 W	06	27	M 44	2 NM	18	1000.0	10.0	10.0	19	32.5			
WNOM	26	42.5 N	127.7 W	06	35	M 50	5 NM	03	1020.0	12.0	12.2	9	14.5	36	8	6.5
BLHX	26	42.9 N	171.5 W	12	29	36			1009.0	8.5	11.0					
BPLK	26	36.8 N	122.7 E	12	01	66										
D5ZU	26	53.7 N	176.7 W	12	33	M 38	5 NM	51	0996.0	2.2	3.0					
KHRK	26	38.0 N	133.3 W	12	04	M 35	5 NM	02	1024.0	13.0	14.0	3	8	04	5	8
H8GC	26	51.9 N	160.5 W	17	14	M 32	.5 NM	52	0991.0	6.0	3.5	5	19.5	13	5	19.5
3EOU	26	54.0 N	173.6 W	18	33	M 32	200 YD	78	0981.0	2.0	4.0	5	11.5	31	12	29.5
5MSS	26	56.9 N	168.4 W	18	27	M 44	.5 NM		0999.7	7.3		8	19.5	27	8	19.5
ABGJ	26	46.9 N	126.5 W	18	31	M 38	10 NM		1017.0	10.0	12.0	10	10	31	10	10
D7XP	26	37.9 N	133.9 W	18	02	40	10 NM	03	1024.5	13.0	15.0	7	14.5	02	9	16.5
GXIB	26	48.5 N	127.3 W	18	34	37	10 NM		1016.6	9.4	10.5	5	8	33	12	16.5
KACK	26	40.0 N	124.8 W	18	01	35			1013.0	8.3	10.7	8	24.5	10	10	19.5
KCKB	26	31.4 N	135.3 W	18	05	35	5 NM	15	1019.5	15.6		5	10	05	8	19.5
KGJX	26	44.7 N	172.0 W	18	29	M 48	10 NM	01	1007.0	7.2	6.0	4	10	28	13	21
KGSM	26	49.6 N	128.4 W	18	34	40	10 NM	02	1018.9	10.6	6.7	5	6.5	34	11	14.5
3EOU	27	53.9 N	175.1 W	00	30	M 35	2 NM	74	0987.8	4.0	4.0	8	16.5	30	12	26
7JRM	27	40.2 N	167.2 W	00	26	20	10 NM		1014.5	13.0	13.0	4	11.5	33	11	24.5
BPJE	27	36.5 N	122.5 E	00	01	80										
D7XR	27	37.4 N	131.4 W	00	36	45	5 NM	03	1021.5	12.0	14.0	7	16.5	26	8	24.5
EWGF	27	41.5 N	124.4 W	00	34	37	5 NM	07	1012.9	10.4	10.2	5	10	34	8	19.5
JGTS	27	49.2 N	163.3 W	00	24	M 40	2 NM	50	0995.9	7.0	4.0	3	5	18	6	13
JIOW	27	54.3 N	171.7 W	00	09	M 41			0979.0	4.0	5.0	5	10	10	5	11.5
JQTM	27	12.9 N	99.8 W	00	22	M 11	10 NM	01	1007.1	29.5	30.0	3	5	21	75	28
KGJR	27	37.7 N	126.0 W	00	34	30	10 NM	02	1016.9	11.0	13.0	6	13	04	10	19.5
KPDV	27	38.0 N	134.5 W	00	03	24	10 NM		1026.2	12.2	15.6	5	13	04	9	23
LHOE	27	35.9 N	130.5 W	00	02	28	5 NM	02	1019.0	14.0		0	6.5	03	11	19.5
SFMY	27	43.0 N	171.2 W	00	29	M 30	10 NM	02	1015.2	10.7	9.0	17	23			
WGKF	27	47.2 N	162.3 W	00	22	M 36	5 NM	25	1003.2	10.0	6.0	6	8	24	7	8
WSDX	27	48.9 N	128.8 W	00	33	M 41	> 25 NM	02	1019.0	10.0	10.6	4	6.5	34	5	10
WTST	27	43.1 N	157.2 W	00	20	M 16	10 NM	02	1018.5	11.7	10.0	2	1.5	20	9	36
46020	27	55.9 N	168.0 W	06	36	M 71			0982.2	4.2	3.4					
JJAD	27	54.0 N	176.6 W	06	31	M 48	5 NM	60	0994.0	4.0	4.5	7	13			
JMRB	27	53.3 N	175.3 W	06	30	M 38	2 NM	07	0992.0	4.0	4.5	6	19.5	31	8	24.5
JPZD	27	41.3 N	160.1 W	06	25	M 10	10 NM	02	1021.8	12.0	15.0	3	5	27	12	19.5
KCKB	27	32.3 N	133.5 W	06	05	30	5 NM	07	1019.5	14.4		4	10	04	8	19.5
EIJG	27	39.4 N	124.7 W	12	35	M 37	10 NM	02	1012.8	10.5	9.0	4	10	34	9	16.5
UHNX	27	30.3 N	137.0 E	12	03	35	10 NM		1013.8	22.1						
JABN	27	53.7 N	153.6 W	18	19	M 23	1 NM		1019.0	5.5	5.1	4	6.5	21	7	19.5
KHBA	27	58.6 N	144.6 W	18	10	25	2 NM	41	1026.9	9.0	7.3	6	6.5	16	9	19.5
46020	28	55.9 N	168.0 W	00	01	M 77			1000.1	4.2	3.4					
D7AH	28	54.0 N	160.0 W	00	18	M 37			1014.0	8.0	7.0	6	14.5	29	6	13
GYYA	28	35.3 N	174.5 W	00	29	M 04	10 NM	03	1028.6	16.8	16.8	1	1.5	30	6	19.5
KCSA	28	39.5 N	124.2 W	00	34	40	5 NM	02	1011.2	12.8	11.1	6	14.5	33	6	14.5
WFQE	28	38.5 N	124.3 W	00	34	M 38	5 NM		1011.0	15.0	10.6	5	10	34	10	16.5
JGWR	28	27.8 N	141.2 E	06	13	M 11	10 NM	02	1018.8	25.0	24.0	3	1.5	13	9	36
WNOM	28	50.6 N	134.9 W	06	33	M 45	5 NM	02	1029.2	8.0	10.0	6	10			

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C Air	Temperature °C Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
PACIFIC	MAY															
JFQU	28	46.6 N	155.3 E	12	13	M 40	.5 NM	54	1006.5	4.0	3.0	6	6.5	15	8	10
WLRL	28	38.0 N	124.6 W	12	33	36	10 NM	02	1013.8	10.0	9.4	3	6.5	33	6	13
UKGF	28	38.0 N	146.5 E	18	22	35	10 NM		1012.7	16.0	15.5	7	13			
OYKS	29	44.5 N	155.3 E	00	06	M 40	2 NM	50	1007.0	12.0	5.0	5	5	26	6	5
D52U	29	46.9 N	165.0 E	06	17	M 37	1 NM	62	1013.0	7.0	0.0	7	5	18	11	10
JGRP	29	44.4 N	152.7 E	09	22	M 43	5 NM	01	1003.5	7.0	7.0	5	5	21	7	8
3EOU	29	51.1 N	166.9 E	12	25	M 38	5 NM	04	1018.5	3.0	4.0	8	6.5	25	8	8
46020	29	55.9 N	168.0 W	21	36	M 52			1019.7	4.6	3.8					
ELXP	30	53.0 N	172.0 E	00	17	M 40	2 NM	11	1009.0	5.5	7.0	8	11.5	18	6	11.5
G.OL	30	45.9 N	157.6 E	00	24	37	10 NM		1004.1	5.6	4.1	4	16.5	21	6	11.5
UPKN	30	45.8 N	149.3 E	06	28	16	> 25 NM		1001.1	15.0	4.5	30	23			
3EOU	30	49.1 N	160.9 E	12	24	M 38	50 YD		0997.0	3.0	6.0	6	6.5	24	6	6.5
D5FU	31	37.1 N	143.7 E	00	09	M 35	10 NM	03	1014.5	18.0	16.0	6	6.5	07	7	6.5
D7JG	31	53.1 N	179.6 W	06	21	M 37	200 YD		1011.8	6.5	9.0	4	6.5	20	14	8
ELBM9	31	26.9 N	114.9 W	12	32	20	5 NM	02		16.0	16.0	14	23	32	13	21
GQUN	31	35.6 N	142.5 E	12	14	M 35	5 NM	18	1010.0	21.0	22.1	4	6.5	13	4	5
USNC	31	41.2 N	139.4 E	12	09	M 35	10 NM	02	1010.6	13.0	14.1	5	5	09	8	8
GCUV	31	36.3 N	143.9 E	18	13	M 35	2 NM	18	1006.5	20.1	21.5	4	6.5	13	4	6.5
PACIFIC	JUNE															
KRHZ	1	52.3 N	140.4 W	00	32	54	5 NM		1024.5	10.0	9.0	3	6.5	34	5	10
3FYI	1	54.7 N	156.4 W	00	24	M 18	10 NM	01	1032.0	7.5	6.0	4	19.5	24	7	23
UFFU	1	40.4 N	149.0 E	00	11	M 37	10 NM	02	1015.0	12.0	14.0	7	6.5	11	7	6.5
HPKS	1	35.0 N	145.5 E	06	21	M 35	5 NM	44	1000.3	23.0						
UPZP	1	38.5 N	157.1 E	09	13	M 39	1 NM	63	1008.0	16.5	18.0	6	8	14	8	13
7JHM	1	35.1 N	150.2 E	12	20	M 36	2 NM	61	1000.5	20.0	19.0	4	10	18	6	11.5
D5EL	1	14.3 N	125.2 W	18	07	M 27	5 NM	01	1013.4	26.0	28.0	7	8	07	7	19.5
GOUV	1	39.0 N	148.6 E	18	24	M 35	5 NM	50	1002.7	18.4	16.3	4	5	19	4	6.5
46020	1	55.9 N	168.0 W	21	36	M 71			1012.4	4.6	4.2					
46020	2	55.9 N	168.0 W	00	01	M 65			1013.9	5.3	4.2					
LSEL	2	15.5 N	134.7 W	00	06	M 36	5 NM	03	1013.0	25.0	27.0	7	8	36	8	16.5
ELIO	2	43.0 N	163.0 E	00	14	M 40	2 NM	61	1009.0	10.0	8.0	6	10	14	6	10
UFWD	2	47.4 N	162.4 E	00	15	M 39	1 NM	62	1009.5	12.0	11.5	5	11.5	15	6	13
UXFU	2	44.1 N	158.4 E	00	12	M 38	2 NM	61	1001.0	9.7		9	19.5			
LPUP	2	38.0 N	150.8 W	00	03	41	5 NM	03	1027.2	16.5	15.5	5	8	36	6	5
JUXC	2	41.5 N	133.5 E	00	13	68										
UYYA	2	34.7 N	148.9 E	03	23	M 47	2 NM	07	1011.0	21.3	19.3	2	10	23	5	8
LVPO	2	53.7 N	161.0 E	06	22	19	10 NM		0996.7	5.7	4.3	3	6.5	20	8	19.5
JFIR	2	41.5 N	168.1 E	09	10	M 37	.5 NM	63	1015.5	13.5	13.0					
JPHY	2	42.9 N	165.7 E	12	22	M 35	200 YD	63	1014.5	11.0	9.0	9	13	16	9	10
KCAO	2	22.5 N	121.6 E	12	26	35	5 NM	02	1002.7	25.6	27.8	7	11.5	26	8	11.5
WSVR	2	13.8 N	94.2 W	12	36	40	10 NM	02	1003.7	25.6	30.6	6	10	34	6	10
WLAP	2	16.3 N	130.6 E	18	07	78	10 NM		1010.8			1	1.5			
LLVA	2	48.6 N	175.4 E	23	16	M 29			0999.7	7.0	0.5	12	19.5	16	5	19.5
JFZZ	3	49.0 N	174.1 E	00	29	24	2 NM		0998.8	8.0	4.0	6	10	18	11	19.5
SVYF	3	19.1 N	124.3 E	00	17	M 41	10 NM	02	1009.1	28.0						
AFYI	3	54.3 N	175.6 W	00	18	M 26	2 NM	10	1019.7	5.0	4.2	4	19.5	18	7	23
UFZU	3	34.9 N	140.2 E	00	19	M 37	1 NM	59	1000.3	23.2	16.0	4	6.5	20	8	11.5
JCAD	3	30.1 N	134.6 E	00	18	M 37	.5 NM	62	1000.0	24.0	22.0	5	8	18	8	11.5
7LKH	3	59.2 N	171.8 E	06	29	M 45	5 NM	25	0996.5	6.0	7.0	6	10	25	10	28
ARKP	3	38.2 N	149.0 E	06	19	M 35	1 NM	10	1001.0	21.0	19.0	6	6.5	19	6	6.5
UFKL	3	35.8 N	160.3 W	06	06	M 20	2 NM	16	1020.9	15.5	17.2	6	10	09	8	23
UKCL	3	50.5 N	176.4 W	06	15	M 44	1 NM	62	1004.4	5.5	5.7	6	26	24	6	13
JCVS	3	37.6 N	147.2 E	06	20	M 36	.25 NM	41	0999.6	20.0	21.0	5	10			
JLIL	3	54.1 N	171.9 W	06	19	M 38	5 NM	02	1019.5	6.0	6.0	5	6.5	19	10	13
LPUP	3	52.6 N	170.2 E	12	02	M 42	10 NM	02	1000.0	4.0	5.0	7	8	03	8	10
HFLP	3	41.5 N	148.7 E	12	20	M 50	50 YD		0998.5	10.0	6.0	9	8	20	13	5
JCZF	3	51.4 N	176.8 W	12	25	M 39			1001.5	6.0	5.0	5	13	23	7	16.5
JFKC	3	38.7 N	148.0 E	12	19	M 35	2 NM	21	1006.7	18.9	17.5	8	6.5	22	11	10
5PCT	3	53.4 N	174.2 E	12	27	M 56	5 NM	00	0989.5	3.5	5.0	7	6.5	27	8	13
UFKS	3	31.8 N	141.4 E	12	20	M 35	2 NM		1001.0	24.0						
JFVI	3	52.5 N	170.4 E	15	28	M 76	10 NM	03	1003.5	4.5	6.5	8	10	29	11	16.5
8KRZ	3	53.8 N	171.8 W	18	18	M 41	< 50 YD	45	0999.5	7.0	5.0	2	8	17	5	11.5
ABOJ	3	53.9 N	177.2 W	18	21	M 35	1 NM	74	0993.5	5.0	6.0	4	6.5	21	6	8
CWDX	3	52.5 N	178.4 E	18	25	46	1 NM	59	0991.8	5.0		4	19.5			
NCDF	3	51.9 N	179.6 W	21	25	M 44	5 NM		0998.3	5.4	5.0	4	14.5	27	8	31
JFZZ	4	50.1 N	177.8 W	00	25	31	2 NM		1006.7	6.0	4.5	6	10	25	11	19.5
5LFX	4	53.9 N	174.5 W	00	20	M 41	.25 NM	45	0993.0	6.0						
ABOJ	4	53.9 N	178.0 W	00	23	M 43	1 NM	74	0989.0	5.0	5.0	5	6.5	23	6	6.5
NCDF	4	51.8 N	179.7 W	00	25	M 42	5 NM		0998.0	6.1	5.0	3	10	27	8	19.5
UWUX	4	52.5 N	176.0 E	00	27	35	2 NM	41	0998.5	6.0	0.0	7	26			
UWKC	4	55.4 N	163.6 W	00	14	37	10 NM		1007.3	3.0	4.0	10	13			
JCVR	4	35.5 N	145.3 E	03	21	M 39			1009.5	24.0	21.5	4	6.5	23	6	8
JIAK	4	42.7 N	162.5 E	03	25	M 35	200 YD	62	1007.5	13.5	9.0	5	6.5	22	7	13
8KRZ	4	53.8 N	175.4 W	06	23	M 42			0993.0	6.0	4.5	2	10	23	5	13
ARKP	4	40.7 N	156.1 E	06	17	M 35			1013.0	18.0	12.0					
JPDJ	4	33.6 N	162.7 E	06	21	M 05	10 NM	02	1025.0	22.5	23.0	2	1.5	13	6	32.5
JCZF	4	50.0 N	174.9 E	06	24	M 13			1004.5	6.5	5.5	4	6.5	27	8	19.5
KPDH	4	52.8 N	175.7 W	06	24	35	1 NM		0996.9	5.6	5.6	4	11.5	26	7	23
UOYO	4	54.2 N	160.2 W	12	16	M 35	2 NM	61	1013.2	6.2	5.0	6	6.5	18	8	11.5

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C Air	Temperature °C Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
PACIFIC	JUNE															
ELAW3	4	54.0 N	172.1 W	18	23	M 38	10 NM		0993.0	7.0		7	26	23	7	16.5
UFKS	4	27.4 N	145.0 E	18	13	52	10 NM	02	1017.1	26.4						
UHIY	4	53.2 N	159.8 W	18	21	M 37	2 NM	61	1015.0	5.0	7.4	9	11.5			
UTIX	4	40.8 N	143.5 E	18	19	M 52	10 NM		1011.8							
6ZLH	5	40.0 N	159.5 W	00	14	M 09	2 NM		1018.6	14.0	12.0	8	10	11	15	19.5
D7SF	5	53.6 N	157.3 W	00	18	M 56	200 YD	41		8.0						
ELAW3	5	53.6 N	176.2 W	07	29	M 30	5 NM		0998.7	6.0	6.0	7	18	30	7	19.5
46020	5	55.9 N	168.0 W	12	36	M 49			0992.2	3.4	3.8					
GMOX	5	02.9 N	91.4 W	18	17	M 10	10 NM	01	1012.8	25.2	27.6	2	3	18	4	19.5
UHIY	5	51.2 N	150.7 W	18	19	41	5 NM		1020.0	6.5	9.2	10	13			
5LFX	6	52.7 N	170.3 E	00	34	M 20	.25 NM	56	1007.0	5.0	6.0	6	11.5	36	9	19.5
D7SF	6	54.4 N	163.7 W	00	27	M 68			1011.5	4.5						
JCZF	6	43.9 N	152.5 E	06	22	M 18			1013.5	10.0	7.5	4	5	22	0	44
WHDN	6	59.1 N	150.9 W	18	06	40	2 NM	63	1011.2	6.2	6.7	6	13			
D7SF	7	53.5 N	172.2 W	00	27	M 47			1017.5	6.5						
UFKS	7	15.6 N	152.7 E	12	09	47			1011.9	32.0						
UIGW	7	49.1 N	165.2 E	12	10	M 50	10 NM	01	1005.9	5.0						
46020	7	55.9 N	168.0 W	15	36	M 67			1009.5	4.2	4.2					
L5GV	8	40.0 N	165.5 W	00	32	M 48	10 NM	03	1015.5	13.0	14.5	4	6.5	30	8	11.5
D7SF	8	57.7 N	179.0 E	00	25	M 39	5 NM	01	1009.5	8.0						
JKCQ	8	38.6 N	155.0 E	00	20	M 40	1 NM	62	1005.0	19.4	16.1	7	10	18	10	13
6020	8	33.6 N	141.4 E	06	02	78										
JGHH	8	27.1 N	138.5 E	09	24	M 13	10 NM	03	1013.0	27.0	26.0	3	1.5	14	8	36
LULM	8	42.7 N	170.4 E	18	21	M 35	.5 NM	52	1008.0	14.0						
UEXZ	8	50.9 N	157.1 E	18	27	35	10 NM	02	0994.6	3.1	3.1	6	10			
46020	8	55.9 N	168.0 W	21	01	M 77			1013.9	4.6	4.2					
JLUR	9	47.5 N	179.8 E	00	20	M 39	.25 NM	63	0997.5	11.0	6.5	5	16.5	22	5	16.5
UTGW	9	44.5 N	154.9 E	00	30	35	10 NM		1009.0	6.0	5.0	6	5			
46020	9	55.9 N	168.0 W	06	36	M 67			1008.4	4.7	5.0					
UHCO	9	54.7 N	173.2 W	12	11	M 39	2 NM	51	0989.6	5.0	4.8	8	14.5			
IPPL	9	45.5 N	150.0 W	18	33	M 35	10 NM	03	1001.7	8.0	1.0	5	1.5			
ARUH	10	48.6 N	170.5 E	00	27	M 36	5 NM	02	1000.4	7.0	5.0	3	14.5	28	6	5.5
JLUR	10	46.8 N	173.3 E	00	25	M 37	5 NM	01	1006.0	6.5	7.0	4	14.5	25	7	16.5
OXZH	10	49.6 N	169.6 E	00	28	35	5 NM	50	0999.0	7.2		5	13	28	10	16.5
JPHH	10	51.1 N	173.8 E	03	29	M 36			0989.0	5.0						
46020	10	55.9 N	168.0 W	06	36	M 64			0991.1	4.6	4.2					
7KGD	10	48.7 N	178.4 E	06	26	36	2 NM	16	0993.0	7.0	5.0	9	13	26	9	14.5
D7XR	10	53.4 N	174.2 E	06	32	40	50 YD	12	0981.0	5.0						
JEOM	10	50.5 N	178.0 E	06	20	35	5 NM	02	0987.0	4.5	6.0	5	6.5	28	8	5
UICG	10	50.7 N	174.9 W	18	25	35	2 NM	07	0989.3	5.1	6.0	9	23			
7KGD	11	50.0 N	175.4 W	00	26	29	1 NM	58	0994.5	7.0	4.5	10	10	26	13	19.5
KLHR	11	45.2 N	173.0 W	00	27	35	5 NM	02	1009.7	10.0	5.5	7	11.5	28	10	13
VPFW	11	49.5 N	179.6 E	00	28	30	10 NM		1005.2	6.2	6.6	5	6.5	27	10	19.5
LEWZ	11	31.8 N	117.4 W	18	27	45	> 25 NM		1015.0	15.0						
46020	11	55.9 N	168.0 W	21	36	M 37			0990.7	3.8	4.6					
JEMM	12	38.5 N	155.1 E	06	22	M 30			1003.5	19.5	18.0	6	11.5	22	11	19.5
WNDF	12	56.7 N	149.0 W	06	16	M 35	5 NM	02	0999.5	6.7	7.9	3	6.5	16	6	10
46020	12	55.9 N	168.0 W	18	36	M 73			0994.1	4.2	4.2					
46020	13	55.9 N	168.0 W	00	36	M 77			0998.6	4.6	4.5					
6KSP	13	51.3 N	176.1 W	00	27	M 38	10 NM	01	1008.1	9.0	5.5	3	5	24	7	6.5
JNOK	13	30.5 N	134.5 E	09	16	M 36	2 NM	62	1002.8	22.3	22.6	2	5	19	7	3
USXU	13	47.8 N	147.7 E	12	34	45	5 NM		0994.6	2.2	8.1	5	13			
UUIP	13	42.5 N	136.0 E	12	01	39	10 NM		1010.1		11.6					
LVBV	13	47.0 N	152.2 E	18	23	35	10 NM		0995.5	3.2	3.7	7	8			
UBVS	13	51.0 N	156.5 E	18	11	M 37	2 NM	51	0995.1	5.2	2.1	6	6.5			
WTSD	13	33.3 N	127.6 E	18	29	M 36	10 NM	02	0996.5	18.9	21.1	7	8	30	8	10
DPPA	14	30.9 N	130.9 E	00	27	39	5 NM		0999.4	23.6	22.5	11	19.5			
46020	14	55.9 N	168.0 W	06	36	M 73			1010.7	5.7	5.3					
PHVC	14	37.8 N	179.0 E	06	24	45	10 NM	03	1023.2	19.7		1	1.5			
WLDF	14	41.4 N	126.2 W	06	33	M 36	10 NM		1019.0	13.9	17.2					
BNUM	14	39.1 N	158.0 E	18	20	M 36	1 NM	58	1004.5	20.0	20.0					
4XIL	15	36.1 N	156.6 E	00	23	M 49	2 NM	63	1006.6	21.4	20.5	7	8	18	9	11.5
EKVL	15	37.4 N	155.8 E	06	19	M 62	5 NM	02	1006.5	21.0	17.0	8	11.5	18	8	13
9VRR	15	37.1 N	153.9 E	06	19	M 36	.25 NM		1001.2	24.0	20.0	5	6.5	21	8	10
ESIJ	15	42.5 N	149.0 E	06	01	37	5 NM		0990.0	9.5	6.3	4	8			
UVBO	15	39.9 N	134.2 E	06	12	47	10 NM		1006.0	20.0						
OWCJ	15	38.6 N	123.9 W	12	34	35	2 NM		1011.0	10.5	11.3	3	8	30	7	11.5
WNFJ	15	39.7 N	125.2 W	12	34	35			1011.8	12.0	13.3	6	6.5	34	12	13
WNHL	15	42.1 N	126.0 W	12	36	M 42	2 NM	07	1014.0	10.0		3	8	35	6	11.5
WNCV	15	40.0 N	151.2 E	18	27	M 35	5 NM	25	1004.9	13.6	13.6	7	8	23	9	8
46020	15	55.9 N	168.0 W	21	36	M 75			1019.7	5.7	5.2					
8KSP	16	46.1 N	156.6 E	00	24	M 44	.25 NM	60	0987.7	7.0	4.5	2	5	22	8	10
ELKX	16	41.5 N	149.3 E	00	26	35	5 NM	02	0999.0	17.0	17.0	7	16.5	00	XX	0
HOSP	16	08.9 N	85.7 W	00	31	M 72	5 NM	03	1008.5	28.5		5	1.5	27	8	5
JCLY	16	36.6 N	162.9 E	00	18	36	2 NM		1013.0	22.5	21.0	3	5	19	6	6.5
WNFJ	16	42.0 N	126.9 W	00	34	35	10 NM	01	1015.2	15.5	13.9	6	8	01	9	13
JGTS	16	47.0 N	156.1 E	03	24	M 35	2 NM	71	0987.6	6.5	3.5	4	6.5	20	5	10
UVDV	16	54.2 N	162.2 E	06	04	M 37	200 YD	47	0998.8	2.5	2.0	7	10			
JCLL	16	47.7 N	166.1 E	09	20	M 35	2 NM	15	0995.5	7.5		3	6.5	21	7	8
46020	16	55.9 N	168.0 W	12	36	M 71			1021.5	3.8	5.7					

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C Air	Temperature °C Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
PACIFIC	JUNE															
EVRO	16	52.6 N	159.1 E	12	05	M 50		61	0986.9	6.0	4.5	9	39			
KABD	16	49.4 N	165.5 E	18	23	40	10 NM		0994.0	5.6	5.0	5	10	23	8	32.5
5MZ	17	41.1 N	179.8 W	00	23	M 12	< 50 YD	55	1020.8	21.0	14.0	3	1.5	24	8	36
HZLI	17	49.4 N	167.4 E	00	23	M 40	2 NM	10	0994.0	8.0						
KAID	17	49.2 N	164.9 E	00	24	45	5 NM	02	0999.0	6.1	4.4	8	21	24	9	19.5
KWPI	17	44.0 N	158.8 W	00	31	33	5 NM	15	1009.5	14.4	8.3	6	10	33	24	19.5
4KD2D	17	55.9 N	168.0 W	06	36	M 64			1017.8	4.5	6.1					
UPND	17	46.2 N	170.0 E	06	20	39	200 YD	45	1007.0	12.0	9.0	4	5	26	5	8
UDZF	17	47.6 N	168.7 E	09	20	M 35	50 YD		1003.5	7.5	4.0	4	8	22	7	13
K5UF	17	43.7 N	155.5 W	12	25	M 25	10 NM	02	1010.0	11.0	12.0	5	10	25	10	19.5
U5ZT	17	55.9 N	162.5 E	12	29	M 12	10 NM	02	0992.2	3.5	5.8	4	3	04	12	19.5
HOVS	18	53.6 N	170.8 W	00	22	M 30	.25 NM	18	1006.5	6.0	0.0	9	18	22	9	19.5
HTYD	18	35.8 N	154.5 E	03	21	M 40	.25 NM	41	1000.0	22.0	20.0	5	8	19	5	11.5
UKZ6	18	12.9 N	93.8 W	06	27	M 36	1 NM	92	1005.0	26.0	27.0					
UCLH	18	37.2 N	160.3 E	12	20	M 40	2 NM	63	1002.0	20.5	17.5					
UHIY	18	46.1 N	124.3 W	12	32	12	10 NM		1015.2	10.7	13.0	12	21	31	7	5
KIPL	18	59.5 N	145.5 W	18	01	M 20	5 NM	59	1008.5	11.7	8.3	3	16.5	12	6	31
K5VP	18	44.1 N	129.2 W	18	35	25	10 NM	21	1015.0	14.5	10.6	8	13	35	5	19.5
UFAI	19	37.0 N	165.6 E	00	22	M 36	1 NM	52	1007.0	24.5	18.8	8	10	25	13	15.5
UDPZ	19	40.3 N	169.1 E	02	22	36	5 NM	73	1009.5	16.0	15.5	5	10	22	7	16.5
LZUN	19	41.6 N	161.0 W	06	12	M 66	5 NM	03	1023.0	11.0	14.0	3	6.5	03	4	6.5
ULMD	19	41.0 N	179.2 W	06	21	M 36	2 NM	62	1007.0	15.5	14.0	7	11.5	25	9	13
NCYV	19	41.7 N	179.3 W	06	21	M 35	.25 NM	02	1011.1	12.2	11.1	5	5	21	7	10
3FLI	19	50.8 N	157.2 E	06	26	47	10 NM	02	1005.7	6.0						
3MUR	19	36.7 N	171.4 E	12	22	43	5 NM		1012.6	21.6	21.0	8	10			
KDJF	19	43.7 N	179.0 W	12	24	M 40	200 YD	63	0995.5	12.5	1.0	10	14.5	22	6	9
UFLK	19	41.5 N	171.7 W	18	01	46		63	1005.0		12.5	4	6.5	20	12	13
UPSD	19	48.6 N	169.6 W	18	13	M 39	.5 NM	65	0999.2	8.0	7.0	5	8	16	6	10
UJNU	19	49.5 N	168.3 W	18	11	M 43	1 NM	71	0994.2	1.0	7.5	6	10			
4KD2D	19	55.9 N	168.0 W	21	01	M 36			1003.1	6.5	5.7					
4KD2D	20	55.9 N	169.0 W	00	01	M 35			1000.5	6.9	5.7					
LSFF	20	37.5 N	171.1 E	00	07	M 12	5 NM	02	1015.0	19.0	18.0	6	10	07	7	19.5
UPES	20	45.6 N	164.3 W	00	16	M 39	.25 NM	63	1002.5	11.5	7.0	4	6.5	15	9	13
UFMT	20	39.5 N	168.9 W	00	32	M 35	1 NM	62	1010.5	17.0	12.5	5	11.5	23	8	10
UPHY	20	43.4 N	167.5 W	06	19	M 35	.25 NM	63	1003.7	12.0	11.0	7	11.5	18	10	10
KCPO	20	50.0 N	170.9 W	06	28	M 36	5 NM	02	0993.7	7.8	7.3	5	10	28	8	14.5
UFLH	20	23.0 N	135.0 E	09	25	05	10 NM		1011.2	29.5	32.0	3	0	29	7	32.5
SMOJ	20	54.2 N	163.5 W	12	10	M 35	5 NM	02	1000.0	7.0	9.0	3	6.5	10	4	6.5
SMKV	20	38.7 N	160.7 W	18	27	25	2 NM		1015.0	20.0	18.0	6	8	29	10	19.5
UZWU	20	31.2 N	166.6 W	23	27	29	5 NM	02	1001.0		7.0	7	11.5	27	8	19.5
SMOJ	21	54.7 N	167.8 W	00	27	M 35	1 NM	70	0993.0	6.0	9.0	4	5	20	4	5
DSFE	22	16.1 N	154.6 E	00	20	M 21	10 NM	02	1005.0	22.5	19.0	4	10	20	12	19.5
KEJM	22	41.5 N	159.4 W	00	07	M 05	10 NM	02	1016.2	11.1	12.2	1	1.5	31	7	19.5
KZJF	22	15.6 N	128.5 E	06	04	23	10 NM	75	1002.4	30.6	28.3	7	19.5	34	7	19.5
KEJF	22	39.7 N	149.3 E	12	07	M 35	10 NM	03	1004.5	19.0	19.0	6	11.5	15	5	8
KZJD	22	29.1 N	124.3 E	12	26	35	5 NM	02	0999.7	22.7	25.0	2	5	29	4	8
4KD2L	22	55.9 N	169.0 W	18	36	M 53			1000.5	5.3	5.3					
LHSC	22	32.3 N	133.9 E	18	06	39	2 NM	63	0998.6	21.0	26.0	8	14.5			
LEAW	22	36.9 N	152.6 E	00	37	42	5 NM	75	0994.0	18.0	22.0	4	6.5	36	6	14.5
4KD2C	23	55.9 N	169.0 W	12	01	M 50			1001.6	6.1	5.3					
UZUI	23	26.6 N	151.5 E	06	26	M 35	.5 NM	91	1008.4	25.0	28.0	6	5	26	8	6.5
CHVT	23	31.3 N	136.6 E	06	20	M 41	2 NM	63	0997.1	24.4	25.5	8	16.5			
HOVS	23	33.1 N	135.5 E	06	08	M 35	< 50 YD	81	0999.0	21.0	15.0	8	13	08	9	6.5
UFCN	23	35.7 N	152.5 E	06	33	M 29	2 NM	70	1000.0	20.5	20.0	4	6.5	30	8	19.5
UKZP	23	10.7 N	126.3 E	06	27	46	10 NM		1007.1	28.9						
SMAR	24	35.8 N	155.7 E	06	22	25	.25 NM	41	0996.6	24.0	20.0	7	14.5	20	9	19.5
HTZZ	24	11.4 N	121.6 E	00	36	M 13			1001.0	26.0	29.0	3	3	03	0	19.5
KFPO	24	32.9 N	122.5 E	06	02	35										
LPKT	24	35.9 N	127.7 E	06	02	39										
URUM	24	35.2 N	141.0 E	06	12	M 36	.25 NM	63	1001.5	23.0	23.5	3	10	13	5	13
UFII	24	46.8 N	177.0 E	06	07	M 29	.5 NM	45	0988.5	7.0	11.0	5	11.5	34	8	19.5
UFZW	24	36.2 N	146.3 E	09	12	M 35	.5 NM	63	1004.5	19.0	23.0	7	8.5	10	8	11.5
ELXP	24	39.1 N	174.6 E	12	21	M 37	2 NM	61	1012.1	18.0						
UFCN	24	35.1 N	144.0 E	12	21	M 35	.5 NM	07	1000.2	24.0	23.7					
KFZM	24	41.7 N	179.2 E	12	19	M 36	5 NM	33	1006.0	16.7	12.2	5	14.5	20	8	16.5
ZFFC	24	46.8 N	87.0 W	12	18	M 08	10 NM	02	1010.3	25.5	26.8	3	1.5	16	8	32.5
4KD2C	24	55.9 N	169.0 W	15	36	M 73			1013.5	5.0	5.3					
LWME	24	22.0 N	141.8 E	18	12	M 75	10 NM	75			28.3	4	10			
SMAR	24	37.2 N	170.6 E	18	28	13	5 NM		1010.6	18.8		2	13	20	6	19.5
KTST	24	42.7 N	147.2 W	18	32	M 34	10 NM	80	1004.3	11.1	13.4	6	10	36	7	19.5
UEDT	25	47.8 N	177.2 E	00	29	M 46	.5 NM	61	0989.5	9.0	6.0	5	10	23	9	16.5
PLYA	25	42.6 N	174.5 E	00	06	M 24	.5 NM		1007.5	17.5	9.0	9	19.5	26	10	13
ZCKP	25	39.5 N	144.0 E	00	05	M 36	2 NM		1004.0	17.0	16.0	6	6.5	35	6	5.5
4KD2C	25	55.9 N	169.0 W	06	01	M 36			1004.6	6.1	5.7					
7KUM	25	22.6 N	137.5 E	06	32	M 35	5 NM	02		28.0	30.0	3	8	13	8	13
DTSW	25	50.7 N	169.4 W	06	12	M 27	5 NM	80	0992.5	7.2	5.0	8	23			
UZUI	25	22.4 N	135.4 E	06	34	M 43	.5 NM	95		28.0	30.0	10	23	34	34	23
ELIQ	25	54.5 N	177.5 W	06	27	M 41	1 NM	63	0990.5	8.5	6.0	5	8	36	5	8
JPTI	25	48.3 N	178.5 W	06	27	M 44	1 NM	10	0987.5	9.0	9.0	7	10	25	8	19.5
JJKG	25	47.6 N	175.0 W	06	22	M 34	5 NM	03	0992.5	8.0	7.5	8	16.5	25	10	45

† Direction for sea waves same as wind direction
X Direction or period of waves indeterminate
M Measured wind

NOTE: The observations are selected from those with winds ≥ 35 kn or waves ≥ 25 ft from May through August (≥ 41 kn or ≥ 33 ft, September through April).

Nationality	Date	Position of Ship Lat. deg.	Position of Ship Long. deg.	Time GMT	Wind Dir. 10°	Wind Speed kt.	Visibility n. mi.	Present Weather code	Pressure mb.	Temperature °C Air	Temperature °C Sea	Sea Waves† Period sec.	Sea Waves† Height ft.	Swell Waves Dir. 10°	Swell Waves Period sec.*	Swell Waves Height ft.
PACIFIC	JUNE															
GWEC	25	25.0 N	120.7 E	06	07	M 36			1003.5	24.0	27.0	5	13			
KFZM	25	41.1 N	171.9 E	06	33	M 18	10 NM	02	1013.0	10.6	11.1	6	10	33	9	19.5
KLIL	25	38.2 N	150.5 E	06	10	25	1 NM	53	1000.0	17.0	17.2	3	8	08	9	13
UFLX	25	25.1 N	127.7 E	12	01	35	5 NM		0998.0	26.5	25.0					
KTDL	25	54.6 N	167.2 W	12	12	M 40	5 NM	00	1000.2	7.0		5	8			
KCUW	26	36.3 N	143.8 E	18	06	36	10 NM	02	1012.5	19.5	20.0					
KDDV	26	38.2 N	149.3 E	18	02	40	10 NM	05	1008.6	17.2	17.8	2	10	02	7	16.5
UALX	26	25.0 N	127.3 E	00	28	M 23	5 NM	02	1002.7	26.5	25.0	7	16.5	30	10	19.5
UHJE	26	48.3 N	179.8 E	00	27	M 43	2 NM	22	0990.5	8.5	7.0	5	8	27	8	16.5
UTEL	26	48.3 N	175.5 W	00	25	M 36	5 NM	25	0992.0	7.0	6.0	7	14.5	24	8	16.5
KENC	26	20.0 N	144.6 E	00	16	29	10 NM		1009.0	29.4		3	3	27	12	13
KLPL	26	38.3 N	157.8 E	00	05	40			1004.5	14.5	16.7	4	11.5	05	6	14.5
KPSP	26	40.7 N	147.3 E	03	05	M 35	10 NM	03	1018.9	17.5	15.0	3	5	08	8	10
UJKD	26	47.9 N	178.2 E	03	27	M 37	5 NM	01	0993.4	6.5	7.0	6	6.5	29	8	23
LENW	26	51.8 N	158.6 W	06	14	M 25	< 50 YD	41	0997.5	7.8	6.0	7	23			
ELANJ	26	48.7 N	178.0 W	06	31	M 35	5 NM		0986.0	9.0	6.0	6	19.5	17	12	29.5
UFLU	26	36.4 N	154.6 E	06	02	M 35	5 NM		1011.3	18.5	21.0	6	8	03	9	13
UICN	26	50.9 N	176.3 W	06	25	M 27	2 NM	21	0980.0	5.4	7.5	4	5	24	12	19.5
UMIK	26	32.4 N	138.1 E	06	04	M 40	.5 NM	65	1004.5	20.5	23.5	7	11.5	05	8	13
UMKP	26	54.5 N	168.0 E	06	35	M 37	10 NM		1000.9	6.3	4.8	7	8			
4KD2I	26	55.9 N	168.0 W	09	36	M 79			0990.9	5.7	5.7					
UFLW	26	37.5 N	156.7 E	09	02	M 43	5 NM	02	1014.5	16.0	18.5	4	6.5	03	6	9
UCDD	26	50.2 N	177.8 E	12	27	M 40			0984.5	6.0	5.0	6	10	28	7	13
UMUC	26	31.0 N	140.7 E	12	33	M 60	200 YD	07		21.0	24.0	12	32.5			
KFWT	26	38.7 N	147.0 E	12	36	M 35	2 NM	62	1000.3	13.4	18.9	5	6.5	36	5	8
JTYN	26	37.5 N	177.2 E	15	23	M 40	200 YD	64	0993.5	21.0	21.0	5	13	21	6	19.5
UDAH	26	41.5 N	130.8 W	18	19	M 35		60	1035.0	15.0	16.0	5	10	18	8	10
JMZH	27	45.7 N	174.8 W	00	35	M 40	5 NM	75	0995.0	10.0	10.0	5	8	35	5	9
HTKZ	27	36.1 N	142.5 E	00	31	M 53	50 YD	65		27.0		6	16.5	31	8	19.5
HOVS	27	40.8 N	149.1 E	00	10	M 42	2 NM	15	1016.5	14.0	7.0	8	13	10	7	11.5
JEMP	27	36.2 N	149.3 E	00	11	M 46	.5 NM	55	1007.0	19.0		6	14.5	12	8	32.5
KLHP	27	34.9 N	140.6 E	00	32	40	10 NM	01	1001.3	19.4	13.9	3	8	05	12	23
SFCY	27	41.0 N	147.2 E	00	08	M 68	10 NM	02	1012.5	13.5	15.5	6	6.5	12	7	5
KSKF	27	37.5 N	141.7 E	00	34	M 45	.5 NM	55	0996.5	14.5	16.0	7	6.5	07	8	14.5
KSVP	27	12.7 N	97.3 W	00	11	36	10 NM	91	1007.4	26.7	30.0	2	6.5	11	6	5.5
JFKV	27	41.2 N	165.0 W	03	20	M 46	.5 NM	07	0991.5	16.5						
ETIP	27	38.4 N	148.3 E	03	11	M 46	2 NM	35	1003.3	16.5	17.0	10	29.5	39	10	19.5
KDJE	27	39.6 N	150.1 E	03	12	39	5 NM		1010.3	16.0	17.0	5	10	11	6	16.5
HVEP	27	38.8 N	161.3 E	06	12	M 48			1009.1	16.5	17.0	4	8	11	8	10
LSXP	27	39.8 N	172.8 W	06	32	M 34	10 NM	15	1000.1	14.0	13.0	8	8	22	2	19.5
KPWV	27	34.7 N	143.5 E	06	27	M 35	10 NM	22	1004.0	21.0	21.0	9	13	28	10	14.5
UDXT	27	39.6 N	150.1 E	06	12	M 38	2 NM	62	1010.8	15.0	19.5	6	14.5	11	8	16.5
KFHX	27	38.2 N	162.0 W	06	22	M 30	5 NM	02	1011.9	16.2	17.2	6	13	25	8	19.5
UCLL	27	36.1 N	144.1 E	09	27	47	10 NM	03	1002.4	18.7	23.0	7	11.5	27	10	23
UHJF	27	38.8 N	147.0 E	09	17	M 40	.5 NM	71	0996.0	17.0	16.5	7	13	19	10	32.5
UFJD	27	30.7 N	138.5 E	09	22	M 12	10 NM	01	1011.5	24.0	27.0	3	3	04	10	21
UMVI	27	33.0 N	150.6 E	09	26	15	5 NM	21	1010.5	23.5	24.0	3	5	24	9	21
KFZM	27	37.9 N	153.7 E	12	15	M 39	2 NM	63	1009.5	18.3	16.1	5	16.5			
SMGJ	27	40.2 N	146.3 E	18	12	M 55		50	0987.0	13.0	9.0	4	10	10	4	16.5
EFPY	27	44.1 N	146.2 E	18	07	35	10 NM		1004.1	6.0	6.0	6	8			
UFII	27	52.5 N	161.0 W	18	03	32	1 NM	65	0969.0	7.0	9.0	6	10	39	7	32.5
KDHV	27	46.8 N	171.3 E	18	30	40	5 NM	02	0999.5	6.1	3.9	1	5	30	6	11.5
4KD2L	27	55.9 N	168.0 W	21	36	M 73			0988.0	6.1	5.3					
4KD2C	28	55.9 N	168.0 W	00	36	M 67			0986.9	6.5	6.1					
UFXP	28	40.3 N	165.1 W	00	19	M 08	5 NM	61	1010.7	14.0	12.0	3	3	26	1	19.5
UTPV	28	52.7 N	165.6 W	00	21	60	50 YD	45	0981.5	8.0						
CSIJ	28	44.1 N	146.1 E	00	08	39	5 NM		0997.7	7.9	6.2	5	16.5			
EVPY	28	44.2 N	146.2 E	00	08	39	5 NM		0999.0	8.1	6.2	7	8			
UYYA	28	45.1 N	162.7 W	00	20	M 30	10 NM	03	1006.9	10.0	9.1	2	8	22	7	21
UFII	28	51.7 N	159.6 W	00	24	M 39			0985.0	7.0	8.0	7	10	19	7	16.5
KHJF	28	38.2 N	144.9 E	00	25	15	5 NM		1006.6	19.5	19.0	4	8	18	10	19.5
KMST	28	53.9 N	158.0 W	00	16	M 35	.5 NM	62	0979.5	10.0	7.5	6	10	14	9	13
K7JF	28	26.7 N	122.0 E	00	09	25			1005.0	24.4	26.1	4	19.5	09	6	19.5
3FPI	28	54.3 N	153.7 W	06	21	37	2 NM	10	0991.0	8.0						
UDHS	28	53.8 N	161.7 W	06	30	M 31				7.5	8.0	5	16.5	26	8	19.5
UFCT	28	53.4 N	151.1 W	06	21	M 35	5 NM	15	1011.0	8.0	7.5	6	10	21	7	13
KIZM	28	36.6 N	147.8 E	06	23	M 22	5 NM	02	1007.8	23.3	18.9	5	10	26	9	23
KKWI	28	52.9 N	156.2 W	12	21	35	5 NM	02	1000.0	7.8	5.6	6	16.5	21	10	19
ZMAP	28	46.2 N	160.4 W	18	19	M 35	5 NM	02	1004.0	13.0	7.0	14	8	19	12	6.5
ELTO	28	53.2 N	167.1 W	00	20	M 40	2 NM	10	0995.0	10.0	8.0	7	14.5	20	12	18
JFGU	29	54.5 N	147.1 W	06	27	M 20	5 NM	03	1014.6	10.0	8.0	5	3	23	10	19.5
JFUJ	29	33.1 N	122.5 E	06	02	M 43			1010.8							
FPJK	29	35.0 N	127.7 E	12	02	54										
UEAL	29	27.1 N	134.9 E	15	20	40	5 NM		1005.5	28.5						
HPAP	29	36.8 N	144.2 E	21	06	M 10	200 YD		1013.6	20.4	5.0	8	11.5	28	11	26
UPGX	30	29.0 N	137.4 E	00	17	M 42	.5 NM	65	0998.5	27.0	26.5	8	16.5	24	13	19.5
4KD2D	30	55.9 N	168.0 W	03	01	M 77			0990.6	6.1	6.1					
JDWV	30	24.8 N	139.6 E	06	27	M 26				26.5	25.5	1	5	25	6	23
UJTT	30	49.8 N	128.1 W	06	29	M 37	5 NM	02	1010.6	13.0	14.0	10	19.5			
KIUP	30	10.3 N	87.8 W	12	07	35	5 NM	01	1008.0	27.2	29.4	3	6.5	07	4	6.5
DZJF	30	29.4 N	142.8 E	18	02	32	200 YD	95	1003.2	21.0	24.0	10	8	21	10	19.5

U.S. Cooperative Ship Weather Reports

April, May and June 1982

TOTAL WEATHER REPORTS RECEIVED FROM US COOPERATIVE OBSERVING SHIPS APRIL-JUNE 1982

SHIP	VIA RADIO	VIA MAIL
3EFD	73	304
3EYK	64	267
4XLE	38	
5LDM		52
5LJT		526
5LPN	97	
5LYC		131
5MBZ	106	147
5MHS	26	
5MOI	27	11
5MUE	12	321
6ZHN	65	62
6ZLN		11
6ZYP		61
9VPU	27	197
A8CM	1	184
A8FW	27	
A8FU	14	
A8HF	15	46
A8YH	27	27
ATEY	47	
C2DO	147	312
C5FE	71	157
D5ID	39	61
D5OE	90	32
D5RO		43
D7FF	26	
DGPL	67	87
DZFE		37
EAFI	15	159
ELAS		59
ELDC	26	34
ELTD	37	274
ELTO	59	21
ELYP	92	242
FOVE	69	
GRFF	96	
H3SK	1	6
H3VZ	24	77
H9CG	8	61
H9TD	7	71
HOMC	123	
HPID	37	167
IRFA	58	67
JDZA	42	15
JKGH	67	6
JRSP	37	117
KAMN	20	17
KATB	69	146
KATP	27	59
KCIE	15	
KCPA	21	124
KDEK		
KEDD	53	367
KEFD	58	102
KFEZ	110	167
KGCO	27	61
KGMK	3	17
KHFA	97	132
KHLD	58	167
KIHK	31	57
KICH	31	137
KIYG	85	171
KLIZ	38	141
KMJH	119	297
KNFN	92	47
KNKZ	27	
KPEM	46	336
KPHF	16	101
KPRI	19	93
KSCR	111	194
KSPY	62	47
KVFG	67	147
KYVS	92	147
LCPD	31	
LFCA	17	74
LGHS	56	69
LIFG	57	47
LKYR	27	
LKYZ	17	23
LSRY	7	61
MDKA		241
MSVK	8	160
NIFX	23	
NLFI		31
NMDL	41	
NODL		
NRCE		121
NRNT	81	
NRRQ	31	
NSTF		73
NYEC	41	137
OKMZ	41	161
OXHS		
OXKF	41	91
OYRS	52	269
PREF		
SFEN	71	67
TEPZH		
WAKH	13	47
WCIU	199	287
WDZW	8	87
WE5279		27
WEZU	43	327
WFCN	109	131
WGJC	72	234
WGLW		
WHCA	53	767
WHTJ	3	
WIMS	71	149
WJMJ	19	107
WJSH	46	47
WKJD	65	241
WLCI	47	41
WLFN	17	31
WLSN	47	121
WMEK	14	120
WMFJ	1	20
WMVF	146	192
WSNB	171	261
WSVL	27	37
WTEE	109	367
WQ7967		6
WSIS	45	163
WSTH	167	393
WTRZ75		31
WTFH	4	4
WTFS	192	134
WVFX	34	267
WXCN		26
WZJC	46	722
YCAT	4	
YTMG	1	

SHIP	VIA RADIO	VIA MAIL
3EFI	68	157
3EZL	138	
5BZ1H7	60	177
5LEU		38
5LRH	62	96
5LPS	1	
5LYO	31	34
5MCH	21	31
5MKV	71	264
5MOL	8	65
5MYK	61	96
6ZEH	7	
6ZMT	33	
9JXI	50	
9VBI	34	157
A8CV	27	218
A8FX		23
A8IO	26	367
A8OD	10	113
A8VI	35	
AITK	9	
C3AC	7	
D5AN	47	21
D5JA	23	56
D5PY		84
D5YM	46	62
D7FH	45	76
DITO	60	
DZDA		37
EHRL	12	9
ELAPT	52	129
ELDJ	24	67
ELIU	66	238
ELOC	145	137
ELRX	58	35
FOYJ	3	
GYFV	130	1
H3KU	14	767
H3YP	26	52
H9TH		167
HCIU	1	
HODL	212	777
HPMC	7	
I8PL	20	
JFIH	14	7
JKZL	47	43
JPRO		84
KAFI	31	365
KADA	26	159
KAEY	8	
KCEJ	68	120
KDDA	53	107
KEAL	6	
KEPV	9	190
KFEV	43	131
KFFV	37	227
KGEI	132	265
KGSK	69	265
KHCF	3	
KHPF	123	777
KIEH	94	110
KIPF	132	732
KIVP	69	87
KLHP	36	341
KMPZ		
KNJG	154	731
KNLU	154	422
KPCV	114	754
KPHG	43	42
KSMN	24	270
KSPF	69	99
KTHL	131	495
KVSL	4	
LADC	92	63
LCCK	11	
LFEI	14	77
LHDL	32	96
LILY	6	
LMBY	20	
NARG	71	
NACK	4	27
NCKF	3	62
NDNB		16
NDTH	3	
NLKL	193	
NMCF	9	29
NODG	49	
NRSI		52
NRFJ	77	49
NRDL	47	
NJOL	17	35
NJNL		27
OWEY	44	44
OXII	63	711
OXIL	106	67
OYMG	26	64
PPFL	23	
SFFU	1	12
WCK137	14	
WA4D16		11
WCIP	43	169
WL3592		111
WL8451		74
WLZH	47	369
WFFW		95
WGUP	47	216
WHMU	10	23
WHTX	31	112
WHTP	27	9
WIHK	56	284
WJRT	15	66
WJGU	147	283
WLAH	46	
WLCJ	7	11
WLDP	61	722
WLSL	22	14
WMCV	117	199
WMMO	28	91
WNFJ	22	16
WNGA	121	169
WNHP	144	146
WPGU	116	125
WRSL	43	24
WSKJ	6	
WSRL	91	
WTDE	236	357
WTEF	6	
WTEW	16	79
WVFJ	102	129
WXR2716		62
WZJG	92	211
XCDA	15	
YTMH	19	

SHIP	VIA RADIO	VIA MAIL
3EKN	36	
3FHK	41	
5LAU		55
5LFX	39	
5LKL	220	440
5LTI	57	55
5LZG	56	18
5MCN	34	75
5MML	36	213
5MRW	35	150
6ZBK	22	61
6ZFW	35	45
6ZOL	40	31
9MTH	1	
9VVK	68	235
A8CY	1	
A8DI	24	47
A8JP	70	38
A8PI	56	362
A8WH	105	
BLMU	15	45
C6MD	25	83
D5DW	84	77
D5MS	67	416
D5TL	51	59
D5ZU	50	99
D7KA	1	
DLDE	213	370
DZHL	2	
EHGU	7	12
ELAV	1	
ELEC	60	433
ELKA	53	321
ELUN	22	
ELYF	21	15
DUZL	44	63
FYFW	135	
H3NM	11	61
H8DF	18	30
H9VM	111	340
HLPT	14	63
HUVS	119	188
HZDP	103	124
ICDK	34	48
JABI	233	128
JMRB	125	
JPNL	73	125
KAAJ	6	
KADP	118	156
K8GA	39	51
KCKU	66	235
KLAF	45	67
KEHJ	20	216
KFRI	48	126
KFDW	50	179
KFGJ	117	335
KGDF	44	148
KGWI	159	367
KHJB	158	347
KHRH	137	335
KIGL	6	75
KIRH	31	136
KJDG	40	194
KLHW	28	79
KNRD	156	119
KNJA	70	16
KORA		54
KPDV	10	52
KPHL		67
KRDH	110	367
KSFW	31	133
KTKX	110	308
KVWA	6	
LCJK	29	35
LLRY	97	
LFEG	33	52
LHUK	144	106
LIDK	62	366
LMRH	3	72
NAEE	16	24
NDPU	1	
NFDT		147
NHNF		72
NJZP	50	148
NLPM	23	
NNMA	2	
NODU	56	
NRCB	22	
NRRP	4	
NRUK	7	
NTYI	16	80
NZSK	1	156
OWEE	58	165
OXJF	23	48
OXZH	60	192
OZFS	11	
PRHI	10	23
SCNA	63	107
WA2806	6	
WD4520	24	129
WCJS	47	143
WL7606		55
WLRW	30	75
WL7M	120	352
WFLH	27	58
WGJW	61	351
WLWA	2	
WHMK	75	171
WHTR	5	
WIEL	50	61
WJRJ	79	269
WJMA	37	151
WLPU	10	
WLCX	15	78
WLDI	125	440
WLRL	115	356
WMFP	2	20
WMSU	41	125
WNCU	203	289
WNEI	123	72
WNPD	110	151
WPGK	35	2
WRGU	70	184
WSLH	121	391
WSRP	39	92
WTDK	23	116
WTEG	69	240
WTEZ	1	
WVMS	128	393
WYBI	99	324
WZJE	59	292
YCML	2	
ZCKD	20	29

SHIP	VIA RADIO	VIA MAIL
YENE		28
3FJK	14	93
5L8U	155	
5LGK	46	31
5LOT	2	76
5LUG		231
5LZI	14	
5MFK	4	
5MPK	12	61
5MSS	25	
6Z8T	22	125
6ZSN	1	
6ZSG		21
9VBS	19	
9VXX	18	226
A8CZ	92	248
A8GJ	8	133
A8JQ	75	291
A8SL	41	67
A8WW	26	19
BLHV	24	
C8TL	20	
D5FU	46	22
D5NW	111	238
D5TM	6	
D7PF	17	53
D8DN		14
DNAD	6	41
DZJF		97
EHQK	14	
ELAW3	14	101
ELEM		153
ELNZ	37	39
ELUL		32
ELYM	9	87
GFEY	260	417
5Z25	153	
H3PW	9	12
H8LK	52	277
H9XW	37	67
HODI	2	242
HPAI	15	75
HZOU	51	143
JBES	177	169
JKPS	63	31
JNRY	157	139
JWWI	217	
KAAV	33	147
KAFC	73	159
K8NC	17	
KCRD	17	45
KEAG	1	
KLHD	17	
KFCS	79	751
KFEJ	99	65
KFMX	74	
KGJB	144	317
KGWU	6	122
KHLN	27	57
KHRK	110	752
KISR	138	292
KIVP	3	15
KKFW	36	115
KLHZ	141	256
KNCS	24	709
KNJF	6	50
KOEW	27	57
KPFA	9	44
KPIV	25	161
KRFC	6	35
KSLB	80	756
KTSU	1	
KVWH	72	783
LCKF	9	32
LEDZ	103	
LFFU	9	
LIRU	37	71
LIDZ	51	238
LMZW	37	
NAQD	103	
NDTM	166	187
NFKQ	29	
NHNU	10	
NKDL	57	111
NLVS	1	
NNHW	91	87
NODX	13	
NRDB	93	
NRLI	44	
NRUD	81	
NUDP	77	72
NZVL	78	
OWHG	19	39
OXKE	3	
OYBG	70	278
PJYG	275	359
S6CE	93	162
SJZN	23	13
WA5307	7	25
WBAE	25	41
WCUU	24	40
WE4805		89
WECB	45	107
WEZI	15	35
WFJE	134	384
WGKC	37	125
WGWB	161	217
WHML	117	220
WHTS	16	45
WIDE	23	88
WJCG	3	73
WJHN	25	
WLAP	30	88
WLCW	8	11
WLDW	14	123
WLSG	30	205
WMEY	35	49
WMSF	42	62
WNDF	211	348
WNEJ	63	317
WNVM	39	61
WPHI	36	75
WSCJ	127	357
WSNA	91	334
WSRY	41	34
WTDL	82	146
WTEK	2	5
WTST	147	213
WWNU	101	317
WY53261		95
WZJF	58	217
YCPH	26	25
ZCKP	61	

SHIP	VIA RADIO	VIA MAIL
3EDU	30	241
3FTB	12	187
5LCI	25	204
5LHX	8	
5LDZ	2	
5LVG	22	
5LZJ	2	79
5MFM		132
5MPQ	65	44
5MTA	57	
6ZCJ		173
6ZHX	10	
6ZWC	21	43
9VNW	12	
9VYA	34	53
A8DD	47	405
A8DL		79
A8KU	3	299
A8TF	43	26
A8YC	20	
PLHW	47	69
CSCW	11	27
D5GD	19	44
D5NZ	107	172
D5VK		32
D7DE	10	
DRTP	1	3
DNKL	37	
DZMK	49	197
ELAD	8	
ELAX5		25
ELFU	20	
ELDC	23	125
ELVA	18	102
FNJE	36	
GPHU	159	300
H3AG	31	368
H3SI	15	102
H9CK	100	194
H970		210
HOKL	2	
HPAU	33	
IBGU	12	
JBMS	71	28
JKHQ	27	376
JNJL	67	
JREL	145	
KACF	27	165
KAIP	21	60
KCAK	15	41
KCSA	102	329
KEAH	72	156
KEMP	36	153
KFCV	109	253
KFEM	99	335
KFLF	11	2
KGJD	65	287
KGXA	27	105
KHLG	28	92
KHPP	93	291
KIHC	35	69
KIYG	43	101
KKJA	90	275
KLJH	97	173
KNEJ	21	76
KNKW	1	61
KOHB	61	11
KPGL	52	91
KPJC	69	232
KRGP	72	192
KSLJ	115	325
KVFN	34	124
KWAH	22	55
LDEF	13	
LEUX	20	72
LFMK	18	114
LICS	51	150
LITA	30	
LNMB	9	
NBAU	71	211
NCFX	16	80
NGDF	122	146
NHWR	72	95
NKRV		96
NMAG		18
NNDU	4	
NODZ	36	
NRDD	71	
NRPJ	51	
NRYD	59	
NVAI	12	
OUIU	64	46
OWIK	93	337
OXNS	18	26
OYII	53	209
PLWD	8	
S6DW	9	
SLFI	39	107
WA8461	7	43
WCGN	129	150
WDOP	69	208
WE4810		63
WELN	24	140
WEZU	45	172
WFGE	107	463
WGKE	3	67
WHPH	97	159
WHMW	11	
WHTU	19	
WIPL	85	115
WJDC	27	165
WKIM	55	115
WLAY	13	264
WLDD	31	89
WLGB	42	70
WMRK	63	68
WMIG	56	167
WMSM	31	85
WNDJ	118	295
WNFJ	68	175
WNVW	28	112
WPJR	24	117
WSDF	102	259
WSNB	34	270
WSVB	60	160
WTDM	64	99
WTFW	9	16
WTWY	18	
WWPI	105	251
WZJA	7	184
WZJG	75	219
YCSA	1	

SHIP	VIA RADIO	VIA MAIL
3EQN	19	
3FXN	3	
5LCU		108
5LIK	123	188
5LPA	62	333
5LWG	63	14
5LZR	5	121
5MGC	205	330
5MPS	19	
5MUC	42	60
6ZDA	13	
6ZKM	76	
6ZWU	10	18
9VPR	23	112
A8BT		17
A8EE	22	94
A8SP	74	93
A8MF		47
A8UA	21	84
A8YI	44	
BLHX	79	103
CSDI	31	
D5HC	38	
D5OD	2	192
D5WE	6	32
D7SD	42	
DDFB	75	
DVEL	10	101
DZSD	4	15
ELAJ6	7	49
EL8G	2	
ELGI	39	45
ELRE	11	
ELXF	15	41
GNUY	27	107
GQDW	85	
H3AU	20	254
H3WN	32	309
H9IB	1	
H8DD	11	
HOKX	1	
HPGV	1	
IBKL	41	86
JDBD	94	27
JKLB	15	197
JNXV	26	27
KAAC	69	184
KACK	87	191
KASJ	33	276
KCBE	1	104
KCSE	38	248
KEAJ	48	105
KEDC	34	40
KFCK	85	301
KFEY	48	267
KFRJ	11	46
KGJX	104	356
KGYE		252
KHLX	104	197
KIBJ	12	
KIHS	7	11
KIYN	15	16
KKLA	34	45
KLPN	77	266
KNFD	39	80
KNKX	8	39
KOHD	19	155
KPSQ	20	150
KPNA	31	24
KRHI	63	145
KSNP	92	707
KVKV	10	93
KYDA	40	142
LDMU		161
LEVN	1	
LGGH	125	149
LICX	16	
LIVI	9	23
LQBY	2	
NBIJ	10	90
NCRG	55	75
NGYS	9	
NIDR	4	203
NKXR		20
NMMJ	107	136
NODG	1	
NOWK	35	
NRDL	12	
NRPK	3	
NSNF	12	14
NWES	8	
OURF	5	
OXFU	138	110
OXDN	112	204
OYIU	11	16
PLYA	44	196
S6MF	10	50
SMWA	135	68
WAFA	44	69
WCHF	84	161
WDOU	110	22
WE4879		9
WEWW	227	456
WF7895	19	75
WGEB	80	161
WGKF	95	393
WHDN	96	98
WHNG	29	91
WHTW	73	
WJAF	28	101
WJDH	19	
WKIY	30	292
WLCG	23	107
WLDF	95	196
WLGP	17	113
WMBQ	8	42
WMRG	33	12
WMTD	10	90
WNDM	58	86
WNGI		15
WOVS	56	
WQZ4220		19
WSDX	35	317
WSNH	54	234
WSVR	123	521
WTEA	230	417
WTER	87	154
WURV	115	241
WXBR	65	103
WZJB	38	197
WZL8193		8
YTFV	14	

SUMMARY: GRAND TOTAL VIA RADIO> 36947 GRAND TOTAL VIA MAIL> 87272

U.S. Ocean Buoy Climatological Data

April, May and June 1982

APRIL 1982

BUOY	LAT	LONG	AIR TEMPERATURE (DEG C) OBS	DAYS	MAX	DY HR	MIN	DY HR	MEAN	SEA TEMPERATURE (DEG C) OBS	DAYS	MAX	DY HR	MIN	DY HR	MEAN	AIR-SEA TEMPERATURE DIFFERENCE (DEG C) OBS	DAYS	MAX	DY HR	MIN	DY HR	MEAN
41001	34.7N	072.3W	719	30	22.1	04 07	06.7	07 15	16.7	719	30	20.5	19 21	17.9	11 18	18.9	719	30	03.2	04 07	-17.0	07 15	-02.2
41002	32.3N	075.3W	719	30	23.7	04 08	10.7	07 17	19.6	719	30	24.2	02 16	20.4	10 10	22.2	719	30	01.2	16 15	-12.0	07 13	-02.5
41004	32.6N	078.7W	720	30	23.8	17 19	09.2	07 16	19.0	720	30	24.0	17 20	19.7	11 19	22.0	720	30	00.9	14 02	-11.7	07 16	-03.1
42001	25.9N	089.7W	719	30	27.7	22 22	21.6	11 01	26.0	719	30	25.7	22 21	23.4	03 10	24.2	719	30	03.2	16 09	-02.6	11 01	01.8
42002	26.0N	093.5W	719	30	26.9	26 17	20.1	12 04	24.6	719	30	26.7	26 19	24.6	01 07	25.7	719	30	00.7	26 17	-05.4	12 01	-01.0
42003	26.0N	086.0W	717	30	27.7	22 22	20.1	26 14	25.4	717	30	29.2	27 20	26.5	01 02	27.3	717	30	00.4	11 03	-07.1	26 14	-01.9
42007	30.1N	088.9W	712	30	24.0	19 22	10.8	06 14	19.2	709	30	23.0	19 21	16.6	01 14	19.9	713	30	03.3	03 00	-07.6	06 14	-00.7
42008	28.7N	095.3W	521	29	25.9	06 01	12.0	11 16	19.8	520	29	22.6	30 20	17.7	01 11	20.0	534	29	05.3	06 01	-07.0	22 19	-00.1
42011	29.6N	093.5W	698	30	26.7	26 23	09.2	11 10	20.2														
44003	40.8N	068.5W	671	30	11.3	27 18	00.0	08 14	06.1	719	30	06.2	30 17	04.3	09 23	05.0	719	30	05.8	27 18	-04.7	07 06	00.7
44005	42.7N	068.3W	651	30	11.3	27 12	00.0	05 09	05.6	206	10	06.4	10 11	04.3	08 01	04.9	719	30	06.3	27 12	-06.3	05 16	00.2
44006	36.3N	075.4W	689	30	17.0	16 22	00.1	07 13	11.4	689	30	15.0	21 17	07.7	01 02	11.1	689	30	07.7	04 21	-06.4	07 11	00.3
44007	43.5N	070.1W	345	16	16.2	30 21	00.0	05 07	06.7	184	08	04.9	04 19	03.5	08 17	04.7	503	23	12.5	30 21	-04.7	05 20	01.0
45002	45.3N	086.3W	360	16	07.1	16 19	00.0	20 06	02.7	383	16	01.5	29 18	00.4	22 06	00.9	383	16	06.2	16 19	-00.9	20 21	01.6
45005	41.7N	082.5W	432	18	13.6	26 03	01.7	15 07	06.3	432	18	08.9	26 20	01.0	13 00	05.9	432	18	15.0	16 17	-02.4	27 13	07.4
45007	42.7N	087.1W	595	26	09.6	25 22	00.0	03 15	03.8	719	30	02.3	20 16	01.6	18 10	02.0	719	30	07.6	25 22	-02.1	07 20	01.1
45008	44.3N	082.4W	248	12	09.0	24 22	00.0	27 17	03.2	190	10	01.3	27 07	00.0	21 10	00.8	274	12	09.0	26 07	-01.0	27 12	02.3
46001	56.0N	148.3W	669	30	04.6	10 03	00.0	01 17	02.5	690	30	04.2	30 23	03.5	03 08	03.7	690	30	01.0	19 21	-03.7	16 08	-01.3
46002	42.5N	130.0W	720	30	11.1	30 21	04.9	05 05	08.4	720	30	10.9	26 23	09.7	05 11	09.9	720	30	00.4	07 23	-04.5	06 05	-01.4
46003	52.0N	156.0W	670	30	05.4	05 21	00.0	01 14	02.4	714	30	05.4	06 02	03.7	02 09	04.2	714	30	00.6	05 21	-04.2	29 08	-02.1
46004	51.0N	136.0W	702	30	07.7	19 20	00.4	12 19	05.0	718	30	06.5	22 01	05.5	01 17	05.9	718	30	01.9	19 20	-04.9	12 19	-00.9
46005	46.0N	131.0W	718	30	09.3	27 23	02.4	12 12	06.7	719	30	11.0	21 23	09.5	01 11	10.0	719	30	-00.9	27 23	-07.3	13 12	-03.3
46006	40.7N	137.7W								712	30	11.6	22 20	09.4	03 13	10.5							
46011	34.9N	120.9W	718	30	17.6	21 02	08.4	01 17	12.9	718	30	16.1	12 21	11.9	19 11	13.6	718	30	03.0	19 19	-04.8	01 17	-00.7
46012	37.4N	122.7W	175	08	13.3	25 19	10.3	30 14	11.9	175	08	15.1	26 00	12.1	29 11	13.5	175	08	-00.2	29 18	-03.5	23 17	-01.6
46013	38.2N	123.3W	718	30	19.1	21 20	06.9	06 17	11.3	718	30	13.7	08 22	10.1	29 11	12.0	718	30	06.8	21 20	-04.7	01 16	-00.6
46014	39.2N	124.0W	715	30	18.4	21 23	06.2	06 14	11.0	719	30	15.9	22 23	10.5	20 13	12.0	719	30	05.2	21 18	-05.5	06 14	-01.0
46019	57.2N	170.3W	132	22	06.1	06 00	00.1	14 06	03.0														
46020	55.9N	168.0W	132	19	05.0	06 00	00.0	02 09	02.3	240	30	03.4	04 12	02.6	01 06	03.0	231	29	02.0	06 00	-02.9	26 21	-01.1
46022	40.8N	124.5W	719	30	15.7	11 02	05.2	01 17	10.4	719	30	14.6	23 02	10.7	07 16	11.1	719	30	04.5	11 02	-05.3	01 17	-00.7
46023	34.3N	120.7W	574	24	15.7	01 21	09.4	07 13	12.7	574	24	14.5	25 23	10.6	17 12	12.5	574	24	07.4	19 10	-02.5	07 13	00.3
46024	33.0N	119.2W	405	17	19.0	22 23	17.3	16 04	18.5	405	17	16.2	19 22	14.4	15 17	15.5	405	17	07.6	21 15	-02.5	25 13	-01.0
46025	33.8N	119.3W	244	11	21.4	22 00	12.5	21 07	15.5	283	11	16.7	20 04	13.4	26 09	14.9	244	11	05.4	22 00	-02.3	21 07	00.6
51001	23.4N	162.3W	720	30	25.5	19 03	19.0	23 19	22.3	720	30	24.4	19 23	22.0	10 07	23.2	720	30	01.1	19 04	-03.8	23 19	-00.9

APRIL 1982

BUOY	LAT	LONG	PRESSURE (MB) OBS	DAYS	MAX	DY HR	MIN	DY HR	MEAN	WIND SPEEDS (KNOTS) OBS	MAX	DY HR	DIR	MEAN WIND SPEED (KNOTS) N	NE	E	SE	S	SW	W	NW	TOTAL
41001	34.7N	072.3W	718	30	1029.2	25 15	994.4	06 14	1016.9	718	37	06 22	300	17.6	14.4	13.4	16.7	19.6	15.1	22.6	20.5	17.8
41002	32.3N	075.3W	719	30	1029.1	24 15	1000.4	06 09	1018.5	716	34	04 02	220	15.5	14.6	10.1	13.1	15.0	16.9	17.1	14.4	14.5
41004	32.6N	078.7W	720	30	1028.9	23 16	1000.5	06 09	1017.3	716	27	03 19	220	13.1	13.6	8.6	11.5	14.1	13.0	12.4	12.4	12.4
42001	25.9N	089.7W	719	30	1021.9	23 05	1008.9	10 21	1015.2	713	31	23 06	030	14.2	15.4	10.5	12.8	11.5	7.6	2.3	7.3	12.3
42002	26.0N	093.5W	719	30	1022.1	23 16	1006.8	15 23	1017.8	714	24	16 06	130	14.0	13.5	11.5	14.1	12.4	8.0	2.1	9.4	12.7
42003	26.0N	086.0W	717	30	1021.9	22 16	1009.4	10 23	1016.2	715	24	11 04	330	10.9	11.3	10.0	11.7	12.1	11.6	7.1	7.4	11.0
42007	30.1N	088.9W	712	30	1027.5	23 23	1005.4	05 23	1016.8	687	27	06 09	350	14.7	16.0	14.6	11.6	10.7	10.1	8.2	10.1	12.6
42008	28.7N	095.7W	576	24	1027.3	23 05	1004.1	14 02	1014.1	577	29	23 00	030	20.7	17.3	12.6	11.6	11.5	7.4	7.7	10.4	13.9
42011	29.6N	093.5W	691	30	1028.4	23 04	1005.4	05 10	1015.0	684	28	06 10	030	18.1	17.4	14.4	11.6	10.8	10.1	10.4	9.1	13.5
44003	40.8N	068.5W	719	30	1030.2	16 15	969.1	07 07	1013.8	714	41	07 04	290	16.3	10.8	10.6	8.6	12.0	13.5	15.3	17.5	14.2
44005	42.7N	068.3W	718	30	1024.5	16 14	969.6	07 05	1011.9	718	45	06 23	080	20.6	21.3	24.4	20.6	16.9	17.0	16.9	23.7	19.1
44006	36.3N	075.4W	689	30	1028.8	23 15	992.5	06 13	1017.6	250	32	06 17	270	14.0	13.7	14.2	12.6	19.1	17.0	18.9	20.5	16.7
44007	43.5N	070.1W	458	20	1024.9	29 14	982.6	07 07	1011.2	451	35	07 02	360	15.0	12.4	5.9	13.7	15.6	13.5	15.2	16.2	15.2
45002	45.3N	086.3W	383	16	1033.0	26 16	1001.0	17 11	1018.6	375	19	20 20	330	7.9	7.8	7.0	6.1	8.3	11.5	6.9	11.3	09.3
45005	41.7N	082.5W	432	18	1031.0	22 17	995.7	11 11	1019.3	426	21	17 23	280	14.0	6.6	7.0	5.6	8.3	8.3	10.0	11.1	08.7
45007	42.7N	087.1W	717	30	1032.6	22 16	975.6	03 10	1016.9	710	36	07 20	270	13.2	10.1	9.4	11.9	16.4	12.0	12.6	16.0	12.0
45008	44.3N	082.4W	274	12	1032.4	29 16	1007.9	26 15	1021.1	271	22	21 07	290	9.0	6.4	5.4	3.3	7.9	10.3	13.1	11.3	09.4
46001	56.0N	148.3W	690	30	1032.6	08 05	975.4	12 05	1005.0													
46002	42.5N	130.0W	720	30	1039.4	18 20	985.6	11 11	1018.2	718	35	07 14	270	12.6	14.3	10.9		13.6	13.9	15.5	13.7	13.9
46003	52.0N	156.0W	714	30	1036.4	09 07	986.6	19 19	1013.6	710	42	12 14	320	21.9	26.6	11.6	11.0	10.6	13.0	20.9	24.8	19.6
46004	51.0N	136.0W	717	30	1037.2	16 19	981.9	12 14	1013.2	713	35	17 07	250	15.9	9.5	3.4	32.8	24.6	16.4	16.1	15.0	16.6
46005	46.0N	131.0W	716	30	1037.8	18 21	987.4	02 11	1016.5	717	30	17 10	200	13.6	12.3	14.7	11.3	16.9	16.3	16.2	13.5	15.0
46006	40.7N	137.7W	712	30	1038.0	18 19	1003.9	12 08	1022.2	704	39	02 03	280	18.2	16.4	16.1	11.1	13.7	18.3	21.8	21.2	18.1
46011	34.9N	120.9W	718	30	1023.4	04 18	1010.5	01 14	1017.2	705	27	16 31	280	5.1	4.1	7.0	12.7	4.7	6.9	14.6	12.6	12.0
46012	37.4N	122.7W	175	08	1021.4	27 19	1012.4	30 11	1017.7	175	26	29 04	340	12.6						5.9	11.8	11.6
46013	38.2N	123.3W	718	30	1026.2	18 16	1007.9	11 12	1019.9	712	34	29 03	310	6.2	5.8	8.3	13.6	14.8	10.5	8.8	17.1	13.9
46014	39.2N	124.0W	719	30	1027.2	18 19	1002.9	11 02	1017.9	708	38	11 01	170	13.9	5.1	6.6	10.9	17.2	12.5	8.3	17.0	13.6
46017	60.3N	172.3W	096	22	1034.4	01 15	996.9	27 09	1015.4	096	26	14 12	030	14.1	13.7	13.7	7.2	9.0	8.6	6.3	10.0	12.9
46019	57.2N	170.3W	240	10	1035.4	01 12	992.0	27 12	1014.3	240	34	10 03	260	15.4	13.8	10.9	16.9	17.7	15.8	15.6	15.0	15.1
46020	55.9N	168.0W	240	10	1032.7	01 21	989.8	27 15	1012.4	236	31	10 03	240	14.2	10.3	14.3	17.8	17.6	14.8	16.2	16.7	15.6
46022	40.8N	124.5W	719	30	1031.6	18 20	998.3	11 03	1019.0	704	34	02 09	170	14.6	6.7	4.8	8.9	21.1	16.2	10.7	8.0	14.0
46023	34.3N	120.7W	574	24	1022.6	12 19	1010.6	20 13	1016.8	472	27	16 04	330	15.2	2.9	10.0	10.7	4.9	1.5	5.2	14.6	13.6
46024	33.0N	119.2W	405	17	1019.2	16 18	1010.7	29 12	1015.7	395	29	16 00	310	7.5	5.2	6.4	2.3	2.6	5.6	9.5	15.6	12.7
46025	33.8N	119.3W	244	11	1018.9	21 20	1011.8	24 12	1016.0	235	15	26 10	280	1.0	5.7	4.5	4.3	4.1	5.5	7.3	5.3	06.2
51001	23.4N	162.3W	720	30	1025.1	28 20	1006.9	07 07	1018.6	717	28	04 03	120	8.5	17.6	16.7	15.0	3.9	4.4	3.5	3.4	16.1

APRIL 1982

BUOY	LAT	LONG	WAVE HEIGHTS (METERS) OBS	MAX	DY HR	MEAN	FREQUENCY OF WAVE HEIGHTS (%) <1M	1-1.5M	2-2.5M	3-3.5M	4-5.5M	6-7.5M	8-9.5M	>9.5M
41001	34.7N	072.3W	716	8.5	07 07	2.4	1.2	34.3	34.4	15.5	10.0	4.1	0.1	
41002	32.3N	075.3W	719	5.5	07 02	2.0		44.2	35.1	14.1	6.3			
41004	32.6N	078.7W	720	4.5	04 03	1.5	10.2	51.5	29.4	7.7	0.4			
42001	25.9N	089.7W	717	3.5	23 07	1.2	14.9	65.1	18.5	1.3				
42002	26.0N	093.5W	706	3.0	11 08	1.4	4.5	68.6	25.3	1.4				
42003	26.0N	086.0W	717	3.0	11 05	1.1	26.4	58.7	14.5	0.1				
44003	40.8N	068.5W	718	8.0	07 05	2.3	4.1	43.0	19.4	17.3	11.1	5.8	0.4	
44005	42.7N	068.3W	717	7.0	07 08	2.0	8.9	46.7	22.3	12.8	6.0	3.7		
44007	43.5N	070.1W	448	5.3	04 05	1.1	33.2	49.1	13.2	7.3	2.0			
45002	45.3N	086.7W	380	2.0	20 21	0.7	47.8	48.1	3.9					
45005	41.7N	082.5W	432	1.5	17 20	0.5	73.3	26.6						
45007	42.7N	087.1W	717	5.0	03 16	1.0	45.2	37.4	6.5	7.9	3.1			
45008	44.3N	082.4W	288	2.5	21 05	0.7	51.1	41.0	7.8					
46001	56.0N	148.3W	584	7.5	12 04	2.7	0.1	27.0	26.3	27.6	10.6	7.9		
46002	42.5N	130.0W	720	9.0	02 16	2.8	0.2	24.0	31.2	25.1	15.9	2.3	3.4	
46003	52.0N	156.0W	709	9.5	12 21	3.2		24.8	28.6	17.6	19.6	9.3	4.0	
46004	51.0N	136.0W	717	7.5	17 08	3.0	0.4	17.7	29.8	25.1	24.6	2.2		
46005	46.0N	131.0W	716	5.5	11 18	2.5	0.8	26.5	33.7	24.3	14.5			
46006	40.7N	137.7W	692	7.5	02 07	2.8	0.2	17.0	40.8	19.3	14.7	7.6		
46011	34.9N	120.9W	713	5.0	04 01	2.0	4.0	36.4	35.7	19.7	3.3			
46012	37.4N	122.7W	174	3.5	29 07	1.6		65.5	21.8	12.6				
46013	38.2N	123.3W	718	6.0	03 11	2.1	7.6	31.6	28.8	26.0	5.7	0.1		
46014	39.2N	124.0W	324	6.0	03 06	2.1	2.7	49.6	15.1	21.6	10.4	0.3		
46022	40.8N	124.5W	715	6.5	03 05	2.6	0.5	29.7	20.8	27.1	20.8	0.8		
46023	34.3N	120.7W	570	5.0	16 08	2.1	2.8	32.8	37.0	21.0	6.3			
46024	33.0N	119.2W	404	3.5	15 22	1.5	5.6	60.3	26.7	7.1				
46025	33.8N	119.7W	244	2.3	29 18	0.9	34.8	64.7	0.6					
51001	23.4N	162.3W	720	4.0	01 10	2.5	.	6.1	59.0	33.0	1.8			

APRIL 1982

BUOY	LAT	LONG	TOTAL FREQUENCY OF WIND SPEEDS (%) CALM	<4KT	4-10KT	11-21KT	22-33KT	34-47KT	>47KT	TOTAL FREQUENCY OF WIND DIRECTIONS (%) N	NE	E	SE	S	SW	W	NW
41001	34.7N	072.3W		1.5	14.1	54.6	28.1	1.7		17.7	12.4	12.8	14.1	17.5	4.6	6.6	14.1
41002	32.3N	075.3W		5.2	27.2	49.4	18.0	0.1		10.0	17.6	9.2	16.1	14.7	11.9	7.5	12.9
41004	32.6N	078.7W		5.4	35.8	52.1	6.7			11.0	21.2	12.6	11.8	9.1	11.5	14.0	8.4
42001	25.9N	089.7W		2.9	35.5	58.3	3.2			6.8	15.3	23.6	32.8	17.7	2.3	0.4	1.1
42002	26.0N	093.5W		4.2	28.6	65.3	2.0			4.6	17.9	28.0	31.5	14.1	1.8	1.4	0.6
42003	26.0N	086.0W		3.9	42.5	53.0	0.6			7.4	22.1	23.1	21.6	11.5	9.3	2.3	2.7
42007	30.1N	088.9W		3.6	36.1	58.4	3.6			6.2	17.0	14.1	32.0	16.6	14.1	4.5	3.5
42008	28.7N	095.7W		2.8	24.9	58.8	13.5			7.2	31.0	14.9	22.3	10.3	7.1	0.4	1.8
42011	29.6N	093.5W		2.3	32.3	54.4	11.0			5.0	27.5	11.5	28.4	16.7	7.7	2.2	0.8
44003	40.8N	068.5W		1.8	21.7	51.1	14.6	0.8		6.8	1.9	2.0	9.1	16.3	16.1	28.6	19.3
44005	42.7N	068.3W		0.4	12.1	54.6	26.7	6.1		8.8	1.8	2.4	3.3	23.7	19.0	28.0	12.9
44006	36.3N	075.4W			12.0	67.6	20.4			17.9	9.1	4.4	10.1	11.7	6.9	12.2	20.7
44007	43.5N	070.1W		3.3	19.3	64.5	12.2	0.7		16.1	4.0	2.1	3.2	20.0	17.5	18.0	19.1
45002	45.3N	086.3W		7.7	50.1	42.1				13.5	12.5	7.0	8.0	9.9	30.8	5.6	12.7
45005	41.7N	082.5W		5.4	68.3	26.3				4.9	11.4	17.0	6.9	11.4	21.2	20.3	6.9
45007	42.7N	087.1W		6.1	37.0	49.0	7.2	0.7		10.4	7.0	12.4	13.4	16.7	13.7	14.2	12.2
45008	44.3N	082.4W		12.2	46.5	41.0	0.4			20.2	12.1	6.4	3.1	13.9	19.5	15.8	8.5
46002	42.5N	130.0W		1.8	26.0	62.4	9.5	0.3		20.0	13.9	2.9		5.4	12.6	24.7	20.5
46003	52.0N	156.0W		2.4	16.2	41.5	29.4	10.4		10.0	2.9	1.2	3.4	11.0	16.7	20.8	34.0
46004	51.0N	136.0W		3.6	15.8	56.1	23.7	0.7		20.1	5.0	0.5	0.2	12.2	22.8	21.6	17.6
46005	46.0N	131.0W		1.5	26.5	49.1	20.9			12.3	3.1	3.3	1.7	8.6	21.1	22.7	27.0
46006	40.7N	137.7W		2.4	11.0	55.7	28.8	2.1		16.6	14.6	5.1	4.5	13.3	9.4	19.3	16.8
46011	34.9N	120.9W		8.4	35.0	49.4	7.2			5.0	2.0	8.5	7.6	3.6	2.9	39.2	32.9
46012	37.4N	122.7W		1.7	51.4	41.1	5.7			22.6						8.3	69.1
46013	38.2N	123.3W		4.4	32.7	43.5	19.2	0.1		1.7	1.0	4.2	4.4	12.5	9.2	17.4	49.2
46014	39.2N	124.0W		9.0	30.9	41.2	17.9	0.8		18.4	4.1	6.7	5.7	14.0	11.6	9.6	29.8
46017	60.3N	172.3W		10.4	27.1	50.0	12.5			48.4	23.7	9.1	4.9	2.3	3.6	3.1	4.7
46019	57.2N	170.3W		3.3	22.9	57.5	15.4	0.8		28.2	10.8	9.7	12.8	3.9	17.6	7.5	9.5
46020	55.9N	168.0W		6.7	14.3	60.5	18.5			25.0	5.6	5.9	10.2	10.7	9.9	10.0	22.8
46022	40.8N	124.5W		7.4	24.6	51.0	16.6	0.4		40.7	5.1	4.0	9.8	16.3	13.8	5.1	5.1
46023	34.3N	120.7W		6.1	25.0	60.2	8.7			22.7	1.4	5.8	8.7	2.1	0.5	1.3	57.5
46024	33.0N	119.2W		8.4	34.9	45.3	11.1			7.7	3.8	2.8	1.4	1.7	1.4	15.0	64.2
46025	33.8N	119.7W		23.4	64.3	12.3				0.4	3.5	6.2	7.0	3.8	10.2	52.4	16.4
51001	23.4N	162.3W		4.7	8.2	77.7	9.3			2.9	40.3	46.3	5.3	1.1	1.5	1.2	1.3

APRIL 1982			% FREQUENCY OF WIND SPEEDS (<4 KTS)								% FREQUENCY OF WIND SPEEDS (4-10 KTS)								% FREQUENCY OF WIND SPEEDS (11-21 KTS)							
BUOY	LAT	LONG	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW
41001	34.7N	072.3W	0.6	0.1	0.1	0.1				0.6	2.1	2.3	2.5	1.3	2.3	0.7	1.1	1.9	10.0	9.6	10.1	7.9	7.6	3.5	1.0	4.9
41002	32.3N	075.3W	0.4	0.6	0.6	0.9	0.5	0.2	0.5	1.4	3.0	5.0	3.9	5.5	4.2	1.9	0.5	3.4	3.5	9.5	4.7	7.0	7.4	6.9	4.8	5.6
41004	32.6N	078.7W	1.0	1.0	1.0	0.1	0.3	0.3	0.5	1.0	2.5	5.8	7.9	5.7	2.1	4.0	4.6	3.1	7.1	12.8	3.7	5.5	6.1	5.9	7.8	3.2
42001	25.9N	089.7W	0.3	0.3	0.4	0.6	0.5	0.3	0.4	0.1	1.3	2.4	13.4	8.9	7.2	1.5		0.8	5.0	10.6	9.6	22.5	9.9	0.5		0.1
42002	26.0N	093.5W		0.6	0.4	0.8	1.3		1.1		1.2	5.8	10.6	6.0	2.8	1.5	0.2	0.3	2.9	11.3	17.0	23.8	9.8	0.3		0.2
42003	26.0N	086.0W	0.1	0.7	0.6	0.5	0.7	0.7	0.4	0.6	4.1	8.9	11.9	8.1	3.8	7.9	1.2	1.6	3.0	12.4	10.6	17.0	6.6	6.1	0.7	0.4
42007	30.1N	088.9W	0.3	<.05	0.3	0.8	0.6	0.7	0.6	0.5	1.6	2.4	3.1	8.3	7.6	7.5	2.8	0.9	5.2	13.3	9.8	12.6	8.4	6.0	1.1	2.0
42008	28.7N	095.7W		0.9	0.3	0.4	0.1	1.2			0.7	4.0	4.6	5.9	3.7	4.4	0.4	1.0	2.6	16.8	14.8	16.0	6.5	1.5		0.6
42011	29.6N	093.5W		2.5	0.1	1.2	0.1	0.9			0.4	4.5	2.3	11.4	7.5	3.4	1.1	0.7	3.1	14.7	7.2	15.2	9.1	3.8	1.1	0.2
44003	40.8N	068.5W	0.1	0.2	0.2	0.2	0.1	0.2	0.4	0.5	1.4	0.7	1.2	7.7	7.6	4.2	5.5	3.4	3.6	0.9	0.3	0.8	8.3	10.1	19.0	8.1
44005	42.7N	068.3W	0.1				0.1			0.2	1.8	0.3	0.6	0.8	2.3	1.7	3.3	1.4	2.8	0.6	0.6	1.0	16.5	14.7	14.0	4.5
44006	36.3N	075.4W									2.9	1.4	2.2	1.7	1.1	0.5	0.4	1.8	14.0	7.1	6.2	8.2	6.9	6.6	8.8	9.8
44007	43.5N	070.1W	0.4	0.5	0.3	0.1	0.3	0.3	0.8	0.4	2.5	1.4	1.6	0.8	2.3	4.7	3.5	3.0	11.3	1.3	0.2	1.8	15.0	17.7	12.3	9.9
45002	45.3N	086.3W	1.1	1.9	2.3	0.4	0.5	1.0	0.4	0.3	9.0	6.2	2.6	7.4	7.7	8.7	2.6	5.7	3.4	4.5	1.9	0.2	1.8	21.1	2.6	6.7
45005	41.7N	082.5W	0.2	0.9	1.9	0.7	0.6	0.3	0.6	0.2	0.6	6.9	13.4	6.0	8.3	17.1	13.0	3.0	4.2	3.6	1.7	0.1	2.5	3.9	6.6	3.7
45007	42.7N	087.1W	0.6	1.0	0.8	0.6	1.0	1.2	0.8	0.1	3.2	3.7	7.3	5.0	7.2	3.6	4.2	2.7	5.3	1.3	3.8	7.3	8.2	5.2	8.2	6.8
45008	44.3N	082.4W	3.5	1.0	1.0	1.9	1.4	0.4		1.0	8.0	7.1	5.4	1.2	10.6	9.1	4.1	3.0	8.7	2.0	0.6		1.9	10.0	11.4	6.4
46002	42.5N	130.0W	0.9				0.3	0.5	0.3	0.2	5.4	3.0	1.1		1.5	7.2	6.1	9.8	13.2	9.1	1.8		2.9	8.1	14.6	12.7
46003	52.0N	156.0W	0.2	0.1	0.2	0.2	0.4	0.7	0.1	0.4	1.2	0.4	0.4	0.4	5.8	5.7	0.8	1.9	3.6	<.05	0.5	2.4	4.8	9.8	9.8	11.2
46004	51.0N	136.0W	0.6	0.8	0.3			0.6	0.9	0.5	2.8	1.9	2.2		0.1	3.3	3.9	3.6	13.4	2.4			3.9	13.8	11.5	11.1
46005	46.0N	131.0W	0.1		0.1	0.3		0.4	0.3	0.2	5.4	1.4	0.0	0.8	2.9	3.9	4.2	9.0	3.5	1.3	1.6	0.3	2.7	11.9	12.9	14.9
46006	40.7N	137.7W	0.6	0.7	0.5	0.7	0.1		0.1	0.1	0.9	1.8	0.7	1.8	2.8	1.7	1.6	0.4	11.2	9.0	2.8	2.4	9.4	5.4	6.9	8.6
46011	34.9N	120.9W	1.2	0.6	1.3	0.6	1.6	0.6	1.0	1.5	3.7	1.4	4.4	2.5	2.1	1.7	6.3	11.1	0.1		3.7	3.9	0.1	0.6	25.7	18.2
46012	37.4N	122.7W	0.6						1.0	0.1	7.6							7.3	36.6	14.0						27.1
46013	38.2N	123.3W	0.5	0.3	0.4	0.7	0.6	0.6	0.5	1.3	1.2	0.6	2.6	1.1	1.6	4.0	11.9	9.7		0.1	1.2	7.5	8.5	4.5	5.0	21.9
46014	39.2N	124.0W	1.5	0.9	1.4	0.2	1.1	0.7	1.5	1.8	4.0	3.1	4.6	2.9	1.9	3.5	5.3	5.9	10.2	0.1	0.8	2.3	7.3	7.2	2.6	10.7
46017	60.3N	172.3W	3.1	3.1	0.8	1.3	0.8	0.3		1.0	9.1	4.2	2.9	2.3	0.8	2.3	3.1	2.3	30.7	12.2	3.6	1.3	0.8	1.0		0.3
46019	57.2N	170.3W	1.1	0.4		0.8		0.8		0.1	5.3	3.3	5.3	0.9	0.4	3.0	2.0	2.6	18.1	5.8	3.6	9.1	2.5	9.4	4.0	5.0
46020	55.9N	168.0W	0.8	1.3	0.4	0.6	1.5	0.4	0.4	1.3	4.5	0.9	1.3	0.8	0.9	2.0	2.1	1.7	18.2	3.4	3.5	5.7	3.7	6.0	5.1	15.0
46022	40.8N	124.5W	1.6	1.7	1.7	1.3	0.5	<.05	0.5	0.9	7.8	3.4	2.1	5.0	0.9	1.5	1.3	2.6	24.8	0.7	0.2	3.3	6.3	10.9	3.3	1.6
46023	34.3N	120.7W	1.0	1.0	0.5	1.2	0.9	0.5	0.4	0.7	5.0	0.4	2.5	1.7	1.0		0.8	13.6	13.3		2.9	5.9	0.2			38.0
46024	33.0N	119.2W	0.6	0.9	0.4	1.1	1.2	0.6	1.6	2.2	6.0	2.9	2.4	0.3	0.5	2.8	7.4	12.7	1.1						6.0	38.2
46025	33.8N	119.3W	0.4	0.9	2.7	3.2	1.2	3.2	8.3	4.3		2.7	3.7	3.8	2.7	6.4	33.8	11.2			0.4			0.6	16.3	1.0
51001	23.4N	162.3W	0.4	0.3	0.8	0.9	0.4	0.7	0.5	0.8	1.8	1.7	1.4	0.8	0.7	0.4	0.6	0.4	0.8	32.9	41.6	2.4				

APRIL 1982			% FREQUENCY OF WIND SPEEDS (22- 33 KTS)								% FREQUENCY OF WIND SPEEDS (34-47 KTS)								% FREQUENCY OF WIND SPEEDS (>47 KTS)							
BUOY	LAT	LONG	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW
41001	34.7N	072.3W	5.0	0.5	0.1	4.6	7.1	0.4	4.2	6.1				0.2	0.5	<.05	0.3	0.6								
41002	32.3N	075.3W	3.2	2.5		7.9	2.5	2.8	1.7	2.5						0.1										
41004	32.6N	078.7W	0.3	1.6		0.5	0.6	1.6	1.1	1.0																
42001	25.9N	089.7W	0.3	7.0	0.2	0.7																				
42002	26.0N	093.5W	0.4	0.3		0.9	0.3																			
42003	26.0N	086.0W	0.1				0.3			0.1																
42007	30.1N	088.9W	1.1	1.7	1.0	0.4				<.05																
42008	28.7N	095.7W	3.5	9.4	0.1					0.1																
42011	29.6N	093.5W	1.6	7.9	0.9	0.6																				
44003	40.8N	068.5W	1.8	<.05	0.3	0.4	0.3	1.6	3.1	7.0							0.6	0.3								
44005	42.7N	068.3W	3.6	0.6	0.4	1.0	4.8	2.6	10.6	3.2	0.6	0.3	0.9	0.9	0.1		0.1	3.7								
44006	36.3N	075.4W	1.0	0.6	1.0	0.2	3.7	1.4	3.2	9.1																
44007	43.5N	070.1W	1.6	0.7		0.3	2.3	0.7	1.4	5.7	0.4							0.2								
45002	45.3N	086.3W																								
45005	41.7N	082.5W																								
45007	42.7N	087.1W	1.3	1.0	0.5	0.4	0.3	0.7	0.4	2.7							0.1	0.6								
45008	44.3N	082.4W							0.3	0.1																
46002	42.5N	130.0W	0.9	1.8			0.7	0.8	3.4	1.8							0.2									
46003	52.0N	156.0W	4.2	2.1	0.1			1.1	10.0	11.9	1.4	0.2					0.1	4.7								
46004	51.0N	136.0W	3.3			0.1	7.7	5.0	5.3	2.4				0.1	0.5	<.05	0.1									
46005	46.0N	131.0W	3.3	0.5	0.7	0.3	3.2	5.1	5.2	2.8																
46006	40.7N	137.7W	4.2	2.7	1.1		0.8	3.1	8.9	7.4							1.8	0.4								
46011	34.9N	120.9W			0.2	0.6			4.2	2.2																
46012	37.4N	122.7W	0.4							5.3																
46013	38.2N	123.3W				0.9	1.9	0.1		16.3							0.1									
46014	39.2N	124.0W	2.8			0.1	3.1	0.3	0.2	11.3				0.1	0.6		0.1									
46017	60.3N	172.3W	5.5	4.7	1.8					1.0																
46019	57.2N	170.3W	3.6	0.8	0.7	2.0	0.9	4.4	1.1	1.8		0.4					0.4									
46020	55.9N	168.0W	1.5		0.7	3.0	4.6	1.5	2.3	4.8																
46022	40.8N	124.5W	6.8	<.05		0.3	6.2	1.4							0.4											
46023	34.3N	120.7W	3.5							5.2																
46024	33.0N	119.2W								11.1																
46025	33.8N	119.3W																								
51001	23.4N	162.3W		5.4	2.6	1.3																				

MAY 1982			AIR TEMPERATURE (DEG C)							SEA TEMPERATURE (DEG C)							AIR-SEA TEMPERATURE DIFFERENCE (DEG C)						
BUOY	LAT	LONG	OBS	DAYS	MAX	DY HR	MIN	DY HR	MEAN	OBS	DAYS	MAX	DY HR	MIN	DY HR	MEAN	OBS	DAYS	MAX	DY HR	MIN	DY HR	MEAN
41001	34.7N	072.3W	742	31	25.8	30 20	15.0	05 04	20.0	744	31	26.5	26 21	18.8	01 05	21.1	744	31	01.3	31 17	-04.5	05 04	-01.1
41002	32.3N	075.3W	740	31	26.0	29 22	18.2	01 02	22.1	740	31	25.4	24 15	21.1	01 09	23.2	742	31	01.9	23 17	-04.8	17 08	-01.1
41004	32.6N	078.7W	742	31	27.3	26 22	18.7	01 01	23.3	743	31	29.1	28 21	22.6	01 08	24.6	743	31	00.6	12 21	-04.6	01 22	-01.3
41006	29.3N	077.3W	127	06	26.2	30 20	22.0	26 17	25.0	127	06	26.1	30 20	24.8	26 17	25.3	127	06	00.4	31 17	-02.8	26 17	-00.7
42001	25.9N	089.7W	743	31	30.7	26 16	24.2	09 21	27.1	743	31	28.5	26 19	23.2	10 03	24.8	744	31	03.8	26 16	-01.8	26 19	02.3
42002	26.0N	093.5W	742	31	29.0	31 17	21.1	07 17	25.5	740	31	29.4	30 20	25.4	14 19	26.1	742	31	00.7	13 20	-04.8	07 17	-00.7
42003	26.0N	086.0W	741	31	29.1	26 23	22.7	31 00	25.8	741	31	30.4	27 19	25.8	21 09	27.7	741	31	00.8	26 23	-04.8	31 00	-01.5
42007	30.1N	088.9W	738	31	28.7	26 19	15.4	08 13	24.2	740	31	30.4	29 21	21.4	01 06	25.6	741	31	00.9	07 22	-07.5	08 13	-01.3
42008	28.7N	095.3W	714	31	27.8	31 20	15.7	07 13	23.7	715	31	27.9	31 22	21.1	02 03	24.4	721	31	01.0	07 00	-06.7	07 14	-00.6
42011	29.6N	093.5W	742	31	28.4	31 22	17.2	07 14	24.4														
44003	40.8N	068.5W	740	31	13.5	30 00	03.0	06 05	08.2	744	31	08.9	31 19	05.7	01 11	07.1	744	31	05.5	30 00	-03.3	06 05	01.1
44005	42.7N	068.3W	743	31	12.8	17 22	03.4	04 09	08.6														
44006	36.3N	075.4W	205	10	19.6	09 04	11.9	05 02	15.1	203	10	16.6	08 21	12.5	05 00	14.1	205	10	07.9	06 16	-01.3	12 01	01.0
44007	43.5N	070.1W	074	04	14.7	31 08	08.8	29 11	10.3	074	04	11.0	31 22	08.8	31 11	09.8	074	04	05.1	31 11	-01.7	29 11	00.6
45001	48.0N	087.6W	579	25	07.1	24 21	01.4	20 10	03.9	579	25	02.3	28 20	00.7	09 10	01.6	579	25	05.2	24 21	-00.2	20 10	02.3
45002	45.3N	086.3W	689	31	08.8	04 22	01.8	08 09	05.0	742	31	02.8	30 19	01.1	02 11	02.0	742	31	07.1	04 22	00.4	08 09	03.0
45003	45.3N	082.8W	665	29	08.5	19 12	00.5	08 10	04.6	684	29	02.2	31 17	00.4	08 09	01.7	684	29	06.7	19 12	-00.3	08 10	03.0
45004	47.2N	086.5W	567	25	08.0	11 22	01.2	09 04	04.1	584	25	01.9	28 21	00.8	09 08	01.5	585	25	06.7	11 22	00.2	09 04	02.7
45005	41.7N	082.5W	742	31	23.5	31 21	08.2	01 00	14.7	740	31	19.2	31 18	06.9	01 10	13.4	742	31	08.6	06 19	-02.8	26 02	01.3
45006	47.3N	090.0W	607	26	09.7	18 22	02.3	21 02	04.1	621	26	02.9	30 18	01.8	06 03	02.2	621	26	07.4	18 22	00.1	21 02	01.9
45007	42.7N	087.1W	697	31	09.8	13 21	03.1	01 09	06.2	742	31	03.4	29 17	02.1	01 00	02.8	742	31	07.2	06 02	00.0	25 08	03.5
45008	44.3N	082.4W	703	31	09.3	18 21	02.2	08 08	05.1														
46001	56.0N	148.0W	708	31	08.1	17 00	00.1	01 09	04.8	708	31	07.7	20 01	03.9	01 07	05.0	708	31	01.1	06 23	-03.8	01 09	-00.2
46002	42.5N	130.0W	742	31	13.3	24 15	08.3	08 18	10.3	742	31	13.1	21 23	10.5	01 05	11.5	742	31	00.9	24 15	-02.9	14 10	-01.2
46003	52.0N	156.0W	742	31	06.6	26 12	00.1	01 18	04.1	743	31	06.6	16 04	04.0	01 15	05.1	744	31	01.2	26 12	-03.9	01 18	-01.0
46004	51.0N	136.0W	742	31	08.8	14 01	02.1	01 08	06.6	743	31	09.0	14 02	05.9	01 10	06.6	743	31	01.8	23 11	-03.9	01 08	00.0
46005	46.0N	131.0W	743	31	11.4	22 20	06.2	01 15	08.4	743	31	13.7	23 00	09.9	01 11	11.1	743	31	-00.4	22 20	-04.2	05 04	-02.7
46006	40.7N	137.7W								740	31	14.2	21 02	10.6	02 11	11.7							
46011	34.9N	120.9W	741	31	15.9	31 18	10.3	23 14	12.4	741	31	15.6	04 23	11.0	18 07	12.5	742	31	01.9	17 02	-01.5	01 12	-00.1
46012	37.4N	122.7W	738	31	14.0	05 23	09.4	11 14	11.3	738	31	13.5	28 01	10.4	18 11	11.9	739	31	01.1	06 00	-02.3	07 07	-00.6
46013	38.2N	123.3W	741	31	13.1	24 22	09.2	11 17	10.5	741	31	14.0	31 02	08.7	22 11	09.9	741	31	02.8	24 16	-02.1	31 03	00.6
46014	39.2N	124.0W	731	31	16.8	24 21	06.9	06 08	10.6	740	31	12.3	05 23	08.8	23 05	10.1	740	31	06.0	24 21	-04.3	06 08	00.5
46019	57.2N	170.3W	208	26	08.2	30 21	00.1	13 18	03.2														
46020	55.9N	168.0W	215	30	05.0	17 03	00.0	22 21	02.8	247	31	04.6	30 03	02.6	01 21	03.3	236	30	01.2	16 18	-03.4	22 21	-00.8
46022	40.8N	124.5W	738	31	12.9	06 01	08.1	30 03	10.5	738	31	11.8	03 21	08.3	27 12	09.8	740	31	02.5	24 20	-00.9	30 03	00.7
46023	34.3N	120.7W	741	31	15.2	27 22	10.2	19 16	12.6	741	31	15.7	31 21	10.9	14 09	13.0	742	31	01.1	15 01	-02.1	19 16	-00.4
46024	33.0N	119.2W	728	31	18.3	04 23	11.6	20 07	13.8	728	31	18.9	04 01	13.2	19 13	14.9	731	31	02.0	03 22	-03.7	20 05	-01.1
46025	33.8N	119.3W	733	31	18.4	16 19	13.1	10 09	15.3	736	31	18.1	19 21	13.9	01 09	16.1	736	31	01.6	16 19	-02.4	30 11	-00.7
51001	23.4N	162.3W	742	31	24.6	19 03	20.6	06 20	23.5	742	31	25.1	26 03	23.5	17 07	24.2	743	31	00.5	16 18	-03.6	15 04	-00.7

MAY 1982			PRESSURE (MB)							WIND SPEEDS (KNOTS)				MEAN WIND SPEED (KNOTS)								
BUOY	LAT	LONG	OBS	DAYS	MAX	DY HR	MIN	DY HR	MEAN	OBS	MAX	DY HR	DIR	N	NE	E	SE	S	SW	W	NW	TOTAL
41001	34.7N	072.3W	744	31	1024.8	01 03	1011.7	09 19	1018.7	735	32	10 23	340	16.6	10.3	7.5	7.7	12.2	11.5	9.9	16.8	12.6
41002	32.3N	075.3W	740	31	1024.3	19 17	1012.7	09 09	1019.0	737	20	01 01	080	11.6	10.0	7.4	7.5	8.2	9.6	10.0	9.9	08.9
41004	32.6N	078.7W	743	31	1023.5	06 16	1011.2	31 07	1017.6	724	21	09 14	020	8.0	8.7	7.2	6.9	7.5	8.8	11.1	5.9	08.4
41006	29.3N	077.3W	127	06	1017.1	29 03	1012.8	26 21	1015.1	126	18	27 17	230				7.8	8.8	8.6		8.0	08.7
42001	25.9N	089.7W	743	31	1020.1	05 16	1007.7	31 00	1014.7	727	23	06 10	120	10.4	11.0	10.5	13.2	10.2	6.8	10.0	9.1	11.2
42002	26.0N	093.5W	742	31	1020.1	04 17	1007.2	31 10	1013.5	740	24	13 01	140	8.6	11.9	11.4	12.9	6.1	2.0		5.1	11.9
42003	26.0N	086.0W	741	31	1019.9	05 16	1009.9	25 22	1015.5	732	23	06 13	100	7.5	10.9	13.0	10.6	11.4	11.6	4.4	5.3	11.4
42007	30.1N	088.9W	741	31	1021.7	04 17	1008.4	31 23	1016.4	716	22	07 23	220	9.5	7.5	7.5	9.8	9.1	6.6	4.4	9.1	08.9
42008	28.7N	095.3W	716	31	1021.1	02 17	1005.3	13 21	1013.5	719	30	13 18	140	13.2	10.7	12.9	12.7	11.1	6.0	7.0	15.6	12.2
42011	29.6N	093.5W	742	31	1021.6	02 16	1007.0	31 08	1014.7	740	28	14 04	110	15.7	9.8	10.6	12.8	10.1	8.0	5.5	11.0	11.2
44003	40.8N	068.5W	743	31	1027.5	23 12	1005.4	30 08	1016.3	703	21	11 20	010	13.2	10.6	10.5	8.2	8.6	11.4	8.5	8.4	10.6
44005	42.7N	068.3W	743	31	1030.6	23 17	1005.3	20 23	1016.9	743	28	12 01	050	11.4	14.7	11.1	9.0	11.2	10.0	6.0	6.6	10.7
44006	36.3N	075.4W	205	10	1024.5	05 15	1011.6	09 00	1017.3													
44007	43.5N	070.1W	740	31	1031.1	23 19	1003.4	20 21	1017.5	730	22	19 22	190	10.1	9.9	7.8	7.2	8.2	8.8	5.8	7.3	08.5
45001	48.0N	087.6W	579	25	1027.0	21 15	1005.3	11 10	1016.3	565	22	11 02	150	8.3	8.0	7.5	10.4	6.5	8.4	5.3	7.6	08.1
45002	45.3N	086.3W	742	31	1025.8	09 15	1003.6	07 01	1016.3	496	15	16 03	210	6.4	7.0	6.3	5.9	7.0	7.0	4.0	4.9	06.4
45003	45.3N	082.8W	684	29	1025.6	09 19	1005.4	31 23	1016.9	658	18	05 18	170	4.2	5.9	7.0	6.8	8.0	6.0	4.6	5.8	06.6
45004	47.2N	086.5W	584	25	1026.1	09 15	1003.4	31 21	1016.2	566	17	10 16	150	6.6	6.8	7.6	7.9	6.0	5.5	4.4	6.6	07.0
45005	41.7N	082.5W	742	31	1024.5	04 14	1003.1	30 10	1016.0	712	20	22 04	100	4.9	6.4	8.1	6.0	4.7	6.2	5.2	4.7	06.4
45006	47.3N	090.0W	621	26	1025.8	21 14	1004.4	18 15	1015.1	592	18	11 01	060	4.6	9.4	9.6	7.3	5.3	8.3	7.2	4.3	08.4
45007	42.7N	087.1W	742	31	1024.8	01 16	1004.1	31 23	1015.3	714	21	20 20	360	8.6	7.3	8.6	8.5	9.3	7.7	5.1	5.5	08.1
45008	44.3N	082.4W	742	31	1025.5	04 15	1005.4	30 07	1017.3	717	15	06 05	190	5.6	7.2	6.4	5.6	8.3	5.7	5.4	5.8	06.7
46001	56.0N	148.0W	706	31	1034.7	29 09	984.9	23 19	1013.1													
46002	42.5N	130.0W	742	31	1033.5	04 19	1014.2	01 03	1024.4	741	27	25 13	360	14.1	12.6	2.0	2.0	13.0	11.0	10.6	12.4	12.8
46003	52.0N	156.0W	743	31	1034.4	29 21	984.0	23 02	1014.2	735	34	22 19	070	14.3	17.1	17.0	17.8	16.6	13.7	13.6	16.7	15.5
46004	51.0N	136.0W	743	31	1033.2	25 20	996.8	16 18	1020.4	737	33	01 22	170	18.9	13.5	14.6	17.3	21.3	17.7	17.8	17.2	18.0
46005	46.0N	131.0W	742	31	1034.5	04 22	1008.5	01 02	1023.3	736	29	16 12	230	12.8	10.3	6.6	7.7	12.6	13.7	14.3	17.7	15.1
46006	40.7N	137.7W	739	31	1036.1	07 20	1014.8	15 16	1028.0	740	29	15 16	200	13.2	15.1	7.3	11.3	12.7	12.7	12.9	12.4	13.3
46011	34.9N	120.9W	742	31	1021.6	06 18	1008.4	26 12	1014.0	706	26	17 23	290	4.5	2.8	2.8	3.9	3.9	4.2	12.6	11.5	10.2
46012	37.4N	122.7W	739	31	1022.8	06 19	1007.7	26 12	1014.8	717	31	09 01	320	13.4		1.0	6.8	8.4	5.4	5.3	13.4	11.6
46013	38.2N	123.3W	741	31	1023.8	06 19	1007.5	27 03	1015.0	733	36	08 19	300	3.8	2.0	1.5	8.3	5.0	3.9	5.6	20.5	17.6
46014	39.2N	124.0W	740	31	1023.0	06 20	1006.6	27 01	1015.2	734	35	08 01	320	15.7	3.9	3.6	3.6	6.7	4.5	3.5	20.9	17.9
46017	60.3N	172.3W	042	15	1027.1	14 15	1004.1	08 18	1015.0	042	20	08 15	040	9.2	11.7	8.2	10.5		7.0		5.5	10.0
46019	57.2N	170.3W	246	31	1026.6	14 21	985.1	26 15	1008.7	242	29	25 21	080	12.6	10.6	14.3	15.4	11.3	11.9	12.0	14.1	13.0
46020	55.9N	168.0W	247	31	1024.3	30 18	980.0	26 15	1006.8	209	149	07 21	360	58.4								58.4
46022	40.8N	124.5W	739	31	1023.7	07 06	1009.0	25 11	1017.8	734	30	04 07	010	15.6	10.1	1.0	1.1	9.0	7.1	5.0	6.4	14.3
46023	34.3N	120.7W	741	31	1021.5	06 18	1008.3	26 12	1013.9	120	19	30 01	320	10.6		4.0	4.0	5.7	5.6	4.7	11.0	09.9
46024	33.0N	119.2W	729	31	1021.3	06 18	1008.1	26 12	1013.6	669	28	18 11	320	6.7	1.7	1.2	2.0	3.0	3.4	6.7	14.1	11.5
46025	33.8N	119.3W	736	31	1021.3	05 19	1008.5	26 12	1013.8	722	21	10 05	280	4.7	2.2	3.2	3.5	2.9	3.9	7.7	6.5	06.4
51001	23.4N	162.3W	743	31	1022.3	21 09	1012.2	06 15	1018.0	739	26	07 03	100	5.7	13.3	14.4	11.6	6.0	6.2	3.4	3.6	13.1

MAY 1982			WAVE HEIGHTS (METERS)				FREQUENCY OF WAVE HEIGHTS (%)							
BUOY	LAT	LONG	OBS	MAX	DY HR	MEAN	<1M	1-1.5M	2-2.5M	3-3.5M	4-5.5M	6-7.5M	8-9.5M	≥10.5M
41001	34.7N	072.3W	744	4.0	11 00	1.4	1.7	79.9	10.0	8.0	0.1			
41002	32.3N	075.3W	739	3.0	12 09	1.2	8.5	77.4	13.9	0.1				
41004	32.6N	078.7W	741	2.5	09 15	0.9	28.2	70.1	1.6					
41006	29.3N	077.3W	126	1.5	27 16	1.0		0.0						
42001	25.9N	089.7W	742	2.5	07 08	1.0	34.6	54.1	11.1					
42002	26.0N	093.5W	741	3.0	13 16	1.1	21.5	67.0	9.8	1.4				
42003	26.0N	086.0W	741	2.5	06 12	1.1	19.6	68.0	12.1					
44003	40.8N	068.5W	744	3.5	11 15	1.4	9.5	63.5	21.5	5.3				
44005	42.7N	068.3W	741	3.0	12 01	1.0	33.3	53.0	12.6	0.9				
44007	43.5N	070.1W	736	1.5	09 22	0.7	63.0	36.9						
45001	48.0N	087.6W	573	3.0	10 22	0.6	63.3	32.6	3.8	0.1				
45002	45.3N	086.3W	696	1.5	05 14	0.3	63.4	36.5						
45003	45.3N	082.8W	663	1.0	05 18	0.2	92.6	7.3						
45004	47.2N	086.5W	556	2.0	20 15	0.4	79.4	19.6	0.5					
45005	41.7N	082.5W	742	2.0	21 23	0.3	87.4	11.9	1.0					
45006	47.3N	090.0W	597	2.0	16 06	0.6	57.6	41.1	1.0					
45007	42.7N	087.1W	727	2.5	20 20	0.3	89.6	9.0	1.2					
45008	44.3N	082.4W	681	1.0	05 13	0.2	92.0	7.9						
46001	56.0N	148.0W	553	5.0	27 02	2.0	9.5	32.3	37.4	13.5	7.0			
46002	42.5N	130.0W	739	5.5	25 21	2.0	2.4	40.3	43.8	10.9	4.6			
46003	52.0N	156.0W	738	7.0	26 10	2.3	1.4	30.0	39.4	16.6	10.9	1.7		
46004	51.0N	136.0W	738	5.5	22 02	2.4	0.8	17.6	41.5	25.6	14.0			
46005	46.0N	131.0W	740	6.0	16 20	2.1	2.4	35.0	36.0	22.5	3.6	0.2		
46006	40.7N	137.7W	733	3.5	16 03	1.7	0.8	51.0	42.4	5.7				
46011	34.9N	120.9W	737	4.5	09 04	1.9	1.2	45.0	42.4	8.5	2.7			
46012	37.4N	122.7W	730	3.5	09 02	2.2	0.1	30.2	47.9	15.8	5.7			
46013	38.2N	123.3W	740	5.0	09 05	2.3	0.4	26.7	43.1	23.7	5.8			
46014	39.2N	124.0W	736	5.5	27 02	2.6		21.0	38.4	26.1	14.3			
46022	40.8N	124.5W	372	5.0	06 07	2.1	1.0	41.5	35.6	9.9	11.7			
46023	34.3N	120.7W	737	4.5	16 11	2.3		20.4	58.3	15.1	5.9			
46024	33.0N	119.2W	710	4.0	18 15	1.5	3.0	72.8	23.4	2.6				
46025	33.8N	119.3W	672	2.5	09 09	1.0	25.4	68.8	5.7	0.1				
51001	23.4N	162.3W	740	3.5	28 07	2.0		22.5	69.8	7.5				

MAY 1982			TOTAL FREQUENCY OF WIND SPEEDS (%)							TOTAL FREQUENCY OF WIND DIRECTIONS (%)							
BUOY	LAT	LONG	CALM	<4KT	4-10KT	11-21KT	22-33KT	34-47KT	≥48KT	N	NE	E	SE	S	SW	W	NW
41001	34.7N	072.3W		5.2	30.9	56.6	7.3			16.4	2.4	3.7	8.2	37.4	21.0	3.3	5.5
41002	32.3N	075.3W		7.5	57.7	34.9				9.1	10.1	11.2	22.9	19.0	13.6	9.6	4.4
41004	32.6N	078.7W		9.6	63.4	26.7				4.7	7.3	6.0	9.3	29.7	20.3	19.3	4.4
41006	29.3N	077.3W		2.4	76.6	20.6							9.3	82.9	6.9		0.8
42001	25.9N	089.7W		1.5	44.2	53.5	0.4			4.9	16.3	50.4	23.8	3.4	0.2	1.2	0.8
42002	26.0N	093.5W		3.0	32.7	60.9	3.4			2.3	10.6	43.8	40.9	2.0	<.05		0.6
42003	26.0N	086.0W		3.7	37.7	58.3	0.3			3.8	37.3	30.4	13.4	4.2	0.6	0.3	1.5
42007	30.1N	088.9W		10.2	56.6	33.1	0.1			5.3	5.1	9.7	44.4	23.1	8.0	2.3	2.1
42008	28.7N	095.3W		1.0	33.1	63.6	2.4			2.0	6.6	26.1	43.2	19.7	2.0	0.1	0.9
42011	29.6N	093.5W		1.9	48.4	45.7	4.1			2.4	4.8	6.2	42.2	31.6	10.3	0.6	1.8
44003	40.8N	068.5W		5.5	44.0	49.5				29.1	10.5	9.6	5.6	9.4	13.6	11.6	10.6
44005	42.7N	068.3W		11.6	44.2	38.0	6.5			18.5	17.4	15.2	9.6	9.3	14.1	6.6	9.2
44007	43.5N	070.1W		10.3	59.3	30.3	0.1			18.2	16.4	12.1	10.5	17.2	14.5	6.2	4.5
45001	48.0N	087.6W		9.7	64.8	25.3	0.2			8.9	20.6	16.8	21.5	7.5	9.7	9.4	6.5
45002	45.3N	086.3W		12.3	80.0	7.7				9.1	22.7	21.0	10.6	10.2	14.5	5.7	6.2
45003	45.3N	082.8W		16.6	71.0	12.5				5.6	7.9	25.7	13.1	20.6	7.2	6.4	13.5
45004	47.2N	086.5W		12.2	74.9	12.9				9.8	15.5	23.8	24.0	6.6	7.5	5.1	7.6
45005	41.7N	082.5W		20.2	70.2	9.6				3.6	11.0	29.2	16.9	11.7	14.1	9.2	4.4
45006	47.3N	090.0W		11.1	57.1	31.8				5.6	30.1	24.5	3.0	3.1	9.9	12.0	3.5
45007	42.7N	087.1W		8.4	69.3	22.3				10.0	9.7	20.0	19.2	20.3	8.4	4.6	7.7
45008	44.3N	082.4W		12.6	76.4	11.0				13.6	20.2	14.7	7.3	23.2	6.0	4.9	10.1
46002	42.5N	130.0W		1.6	29.7	64.5	4.2			41.2	5.5	0.1	0.1	3.3	6.4	14.5	28.7
46003	52.0N	156.0W		3.0	17.0	61.4	18.5	0.1		6.5	8.6	5.0	9.0	22.2	24.7	13.3	10.7
46004	51.0N	136.0W		3.3	10.9	59.2	26.7			12.1	1.7	4.6	2.1	13.5	20.7	18.8	26.5
46005	46.0N	131.0W		4.5	21.5	55.8	17.9			2.5	1.9	2.7	1.6	9.7	20.5	27.2	39.6
46006	40.7N	137.7W		1.4	30.9	62.2	5.5			14.2	27.2	1.1	4.5	7.0	22.2	11.6	12.3
46011	34.9N	120.9W		16.9	35.0	44.1	4.1			1.0	2.7	4.3	5.0	5.3	4.5	43.9	33.4
46012	37.4N	122.7W		7.8	33.0	47.7	11.5			14.1		0.1	1.2	14.4	7.4	4.6	58.3
46013	38.2N	123.3W		6.6	20.7	33.6	37.7	1.2		0.9	<.05	0.2	4.5	4.5	3.2	6.3	80.3
46014	39.2N	124.0W		7.4	14.0	42.1	35.0	1.5		19.1	0.4	0.5	0.9	6.4	2.3	2.3	68.2
46017	60.3N	172.3W		11.9	42.9	45.2				36.3	35.7	6.0	14.9		2.4		4.8
46019	57.2N	170.3W		4.1	35.5	50.4	9.6			24.2	9.0	15.7	16.0	5.0	16.1	8.4	5.7
46020	55.9N	168.0W		1.9	8.1	13.4	17.2	9.1	51.2	0.0							
46022	40.8N	124.5W		4.0	25.1	55.0	15.9			82.5	5.2	0.3	0.3	4.7	2.2	1.2	3.5
46023	34.3N	120.7W		3.3	59.3	38.3				8.5		0.8	1.9	4.4	3.8	6.7	74.0
46024	33.0N	119.2W		15.5	27.1	52.0	5.4			1.2	0.4	0.5	1.6	2.2	4.6	19.1	70.4
46025	33.8N	119.3W		26.5	56.7	16.8				2.4	0.8	2.3	4.8	5.0	14.8	61.2	8.8
51001	23.4N	162.3W		3.4	18.8	76.9	0.9			1.6	32.7	48.4	13.0	2.2	1.0	0.8	0.4

MAY 1982			% FREQUENCY OF WIND SPEEDS (<4 KTS)								% FREQUENCY OF WIND SPEEDS (4-10 KTS)								% FREQUENCY OF WIND SPEEDS (11-21 KTS)							
BUOY	LAT	LONG	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW
41001	34.7N	072.3W	0.6	<.05	0.7	1.3	0.7	0.4	0.7	0.7	1.2	1.3	2.1	5.2	10.9	8.7	1.2	0.8	13.1	1.1	0.9	1.7	25.6	12.2	1.4	0.5
41002	32.3N	075.3W	0.4	0.8	1.4	1.4	1.5	0.9	0.6	0.4	2.8	4.5	7.7	17.0	11.7	7.3	4.4	2.2	5.9	4.7	2.1	4.8	5.8	5.4	4.5	1.8
41004	32.6N	078.7W	0.9	1.3	0.6	2.1	2.2	1.6	0.4	0.9	2.8	3.9	4.7	5.5	23.7	11.9	7.8	3.1	1.0	2.1	0.8	1.9	3.8	6.7	10.1	0.4
41006	29.3N	077.3W					0.8							9.1	62.5	6.2		0.8				0.2	19.6	0.8		
42001	25.9N	089.7W	0.1	0.6	0.6	0.3					2.0	7.2	24.7	7.4	2.0	0.2	0.2	0.5	2.6	6.7	25.0	15.7	1.4			0.3
42002	26.0N	093.5W	0.4	0.3	0.8	0.7	0.6	<.05		0.1	1.1	2.7	14.9	12.7	1.1			0.2	0.7	7.7	27.9	24.3	0.2			0.1
42003	26.0N	086.0W	0.1	0.4	1.0	1.3	0.1		0.2	0.5	3.0	18.3	9.1	5.1	1.2		0.1	1.0	0.7	18.5	26.1	7.5	2.9	0.6		
42007	30.1N	088.9W	0.5	0.5	1.5	3.0	2.2	1.3	0.7	0.5	2.5	3.5	6.2	23.2	12.9	5.6	1.6	1.1	2.3	1.1	2.0	18.3	8.0	0.9		0.5
42008	28.7N	095.3W		0.3	0.1	0.3	0.1	0.7			1.1	2.5	5.5	14.0	8.4	1.3	0.1	0.1	0.6	3.8	20.5	26.9	11.1			0.7
42011	29.6N	093.5W		0.2	0.1	0.5	0.6	0.4			0.1	2.6	3.9	13.5	16.6	9.3	0.6	0.8	1.8	2.0	2.0	25.1	12.1	1.6		1.0
44003	40.8N	068.5W	1.1	0.6	0.7	0.5	0.6	0.1	1.4	1.9	8.4	4.3	3.3	2.9	5.7	6.8	7.3	5.2	19.6	5.5	5.7	7.2	3.1	6.7	2.9	3.9
44005	42.7N	068.3W	2.2	1.1	0.9	1.5	1.1	1.0	1.2	2.5	6.7	4.3	5.7	4.5	4.1	6.5	5.3	5.0	8.8	8.1	8.6	3.6	3.4	3.5	0.3	1.7
44007	43.5N	070.1W	1.2	1.2	1.8	1.1	1.6	1.7	0.9	0.8	8.1	7.4	7.8	8.2	11.7	7.8	4.9	3.5	8.9	7.8	2.4	1.7	3.7	5.1	0.4	0.7
45001	48.0N	087.6W	1.0	1.2	0.8	1.4	1.2	0.8	2.1	1.3	5.9	14.2	13.5	9.7	5.0	6.5	6.1	3.8	2.0	5.2	2.5	10.2	1.3	2.4	0.3	1.4
45002	45.3N	086.3W	1.6	1.7	1.6	1.5	0.7	1.7	1.7	1.6	6.6	19.1	16.1	9.0	6.3	10.4	4.0	4.3	0.9	1.9	1.1	0.1	1.3	2.3		0.1
45003	45.3N	082.8W	1.8	1.8	2.1	2.1	3.0	0.9	2.4	2.6	3.8	6.2	20.7	9.4	11.6	5.9	3.5	10.0		0.2	2.9	1.6	5.9	0.4	0.5	0.9
45004	47.2N	086.5W	1.7	1.2	2.2	1.7	1.3	1.2	1.2	1.5	6.8	13.2	17.3	17.4	5.7	6.3	3.8	5.0	1.3	1.1	4.2	4.9	0.7			1.1
45005	41.7N	082.5W	1.1	2.4	2.6	2.4	4.3	2.4	2.9	1.7	2.4	6.7	20.8	13.6	7.2	10.8	6.1	2.6	0.1	1.4	5.8	0.9	0.1	0.8	0.1	0.1
45006	47.3N	090.0W	1.6	2.6	1.6	0.6	0.8	0.5	1.8	1.6	3.8	19.9	12.2	1.4	2.4	7.0	6.4	2.0	0.1	19.8	10.6	1.1		2.4	1.9	
45007	42.7N	087.1W	2.0	1.1	0.5	0.2	0.6	0.7	1.6	1.7	4.7	7.7	14.9	14.5	12.6	6.4	3.0	5.5	3.3	0.9	4.6	4.4	7.1	1.3	0.1	0.4
45008	44.3N	082.4W	2.4	1.9	1.1	1.6	1.9	1.4	0.8	1.4	10.2	15.8	13.4	5.6	14.6	4.3	4.1	8.5	0.9	2.5	0.3	0.2	6.6	0.3		0.2
46002	42.5N	130.0W	0.4	0.1	0.1	0.1	0.1	0.2	0.1	0.4	10.2	0.8			0.6	2.9	6.6	8.6	26.6	4.6			2.6	3.3	7.8	19.6
46003	52.0N	156.0W	0.4	0.7	0.6		0.6	0.7	0.5	<.05	1.5	2.4	0.4	2.6	2.7	3.6	2.5	1.2	4.0	2.0	2.5	2.9	13.4	19.4	9.3	7.8
46004	51.0N	136.0W	0.2	0.5	0.7	0.3	0.3	0.8	0.2	0.1		0.1	1.2	0.3	0.4	2.5	2.7	3.5	10.6	0.6	1.3	0.6	4.9	12.2	10.4	18.7
46005	46.0N	131.0W	0.1		0.4	0.5	1.0	1.2	1.0	0.4	0.7	0.7	0.2	0.9	3.1	6.9	4.3	4.7	1.7	1.2	0.1	0.4	4.7	8.8	16.3	22.9
46006	40.7N	137.7W	0.1	0.2	0.1	<.05	0.1	0.3	0.1	0.4	4.8	4.8	0.9	1.9	2.0	8.7	4.2	3.6	8.9	19.4	0.1	2.5	4.3	12.6	6.3	9.1
46011	34.9N	120.9W	0.6	2.1	2.9	2.6	2.4	3.6	2.6	2.1	0.2	0.6	1.5	2.4	2.8	7.8	13.9	10.6	0.1						24.3	17.7
46012	37.4N	122.7W	0.3		0.1	0.4	2.3	1.5	0.9	2.3	4.0			0.4	6.9	5.7	3.7	16.2	8.7			0.3	5.2	0.7		33.3
46013	38.2N	123.3W	0.6	<.05	0.2	0.2	1.6	1.7	1.4	1.0	0.2			3.4	2.6	1.5	4.7	8.3				0.9	0.3		0.1	32.2
46014	39.2N	124.0W	0.7	0.2	0.3	0.5	1.4	1.0	1.4	2.0	4.0	0.2	0.2	0.4	3.3	1.1	0.9	3.9	10.6				1.6	0.3		29.6
46017	60.3N	172.3W	6.5	3.0	1.8	0.6					15.5	10.7	2.4	7.1		2.4		4.8	14.3	22.0	1.8	7.1				
46019	57.2N	170.3W	0.9	1.0	0.3	0.4		0.8		0.6	6.3	3.2	6.6	3.2	2.8	8.0	4.0	0.6	16.5	4.2	4.9	10.2	1.9	5.9	2.8	4.0
46020	55.9N	168.0W	1.9								8.1								13.4							
46022	40.8N	124.5W	1.1	0.5	0.3	0.3	0.3	0.1	0.4	0.9	15.7	2.4			2.7	1.7	0.8	1.8	50.1	2.3				1.7	0.4	0.5
46023	34.3N	120.7W				0.3		0.8	1.3	0.4	5.2		0.6	1.0	4.4	2.9	5.4	38.5	3.3							35.0
46024	33.0N	119.2W	0.4	0.4	0.5	1.4	1.4	7.4	5.2	3.8	0.4			0.2	0.8	2.2	10.8	12.6	0.3						2.8	48.9
46025	33.8N	119.3W	1.1	0.7	1.5	3.1	3.3	6.4	7.8	2.5	1.4	0.1	0.8	1.7	1.6	4.2	40.4	4.5						0.1	13.0	1.8
51001	23.4N	162.3W	0.6	0.6	0.5	0.2	0.4	0.2	0.5	0.3	0.7	5.0	5.3	5.2	1.4	0.6	0.3	0.1	0.2	27.1	42.0	7.1	0.3	0.1		

MAY 1982			% FREQUENCY OF WIND SPEEDS (22- 33 KTS)								% FREQUENCY OF WIND SPEEDS (34-47 KTS)								% FREQUENCY OF WIND SPEEDS (≥48 KTS)							
BUOY	LAT	LONG	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW	N	NE	E	SE	S	SW	W	NW
41001	34.7N	072.3W	3.5					0.3		3.5																
41002	32.3N	075.3W																								
41004	32.6N	078.7W																								
41006	29.3N	077.3W																								
42001	25.9N	089.7W			0.1	0.3																				
42002	26.0N	093.5W			0.2	3.2																				
42003	26.0N	086.0W			0.3																					
42007	30.1N	088.9W						0.1																		
42008	28.7N	095.3W	0.3			1.9				0.1																
42011	29.6N	093.5W	0.5		0.2	3.1	0.2			<.05																
44003	40.8N	068.5W																								
44005	42.7N	068.3W	0.8	3.4			0.7	1.0																		
44007	43.5N	070.1W					0.1																			
45001	48.0N	087.6W				0.2																				
45002	45.3N	086.3W																								
45003	45.3N	082.8W																								
45004	47.2N	086.5W																								
45005	41.7N	082.5W																								
45006	47.3N	090.0W																								
45007	42.7N	087.1W																								
45008	44.3N	082.4W																								
46002	42.5N	130.0W	4.1							<.05																
46003	52.0N	156.0W	0.6	3.8	1.4	3.5	5.5	1.0	1.0	1.6		<.05	0.1													
46004	51.0N	136.0W	1.3	0.4	1.4	0.8	7.9	5.2	5.4	4.3																
46005	46.0N	131.0W					1.0	3.7	1.6	11.6																
46006	40.7N	137.7W	0.3	2.9		0.1	0.5	0.6	0.9	0.2																
46011	34.9N	120.9W							3.1	1.0																
46012	37.4N	122.7W	1.1							6.5																
46013	38.2N	123.3W							0.1	37.6								1.2								
46014	39.2N	124.0W	3.8							31.2								1.5								
46017	60.3N	172.3W																								
46019	57.2N	170.3W	0.4	0.5	3.9	2.2	0.3	1.4	0.7	0.4																
46020	55.9N	168.0W	17.2								8.1								51.2							
46022	40.8N	124.5W	15.5	0.1						0.3																
46023	34.3N	120.7W																								
46024	33.0N	119.2W							0.2	5.2																
46025	33.8N	119.3W																								
51001	23.4N	162.3W			0.5	0.4																				

JUNE 1982			AIR TEMPERATURE (DEG C)								SEA TEMPERATURE (DEG C)								AIR-SEA TEMPERATURE DIFFERENCE (DEG C)							
BUOY	LAT	LONG	OBS	DAYS	MAX	DY HR	MIN	DY HR	MEAN	OBS	DAYS	MAX	DY HR	MIN	DY HR	MEAN	OBS	DAYS	MAX	DY HR	MIN	DY HR	MEAN			
41001	34.7N	072.3W	131	06	25.7	02 18	20.6	04 15	23.0	131	06	24.7	02 22	21.9	02 11	22.5	131	06	02.1	02 18	-01.5	04 15	00.5			
41002	32.3N	075.3W	720	30	26.9	23 19	22.7	11 07	24.6	720	30	29.9	27 19	24.2	01 12	25.1	720	30	01.6	19 03	-03.8	11 07	-00.4			
41004	32.6N	078.7W	718	30	27.9	03 16	20.8	13 20	25.7	720	30	28.9	03 16	26.2	19 14	27.1	720	30	00.3	22 20	-06.4	13 20	-01.4			
41006	29.3N	077.3W	717	30	27.9	27 23	22.4	17 14	26.1	719	30	28.4	13 21	25.1	06 11	26.6	719	30	00.9	06 16	-04.3	17 14	-00.5			
42001	25.9N	089.7W	718	30	30.7	19 17	25.6	07 19	29.1	720	30	31.2	24 22	26.3	01 10	27.8	720	30	02.7	19 13	-02.8	07 19	01.3			
42002	26.0N	093.5W	720	30	31.7	25 22	25.9	27 00	28.6	720	30	32.0	18 23	27.7	01 12	29.3	720	30	00.3	18 14	-03.7	27 03	-00.7			
42003	26.0N	086.0W	720	30	30.9	[illegible] 21	23.9	17 03	27.9	720	30	32.1	30 20	27.1	04 09	29.9	720	30	00.7	05 24	-04.8	17 03	-01.0			
42007	30.1N	088.9W	712	30	31.7	06 00	23.6	16 21	28.2	716	30	31.9	11 20	27.4	24 00	29.2	715	30	01.5	24 07	-05.4	16 21	-01.2			
42008	28.7N	095.3W	717	30	31.8	24 15	27.7	01 14	27.8	719	30	29.4	23 22	25.6	15 13	27.8	719	30	03.1	24 15	-04.4	27 17	-00.4			
42011	29.6N	093.5W	711	30	30.1	24 17	23.1	01 14	28.2																	
44003	40.8N	068.5W	719	30	16.9	23 20	07.9	11 14	11.5	720	30	11.4	30 23	08.1	01 00	09.4	720	30	07.5	20 00	-00.9	11 13	02.1			
44004	38.5N	070.6W	459	20	23.1	29 20	15.1	12 07	19.7	459	20	22.6	30 23	19.6	11 16	20.8	459	20	01.8	19 19	-04.9	12 18	-01.1			

JUNE 1982			PRESSURE (MB)								WIND SPEEDS (KNOTS)				MEAN WIND SPEED (KNOTS)								
BUOY	LAT	LONG	OBS	DAYS	MAX	DY HR	MIN	DY HR	MEAN	OBS	MAX	DY HR	DIR	N	NE	E	SE	S	SW	W	NW	TOTAL	
41001	34.7N	072.3W	131	06	1019.5	03 15	1007.0	01 23	1014.3	132	25	01 19	170	6.0	7.6	9.1	13.0	14.9	17.8	7.5	6.3	12.9	
41002	32.3N	075.3W	720	30	1021.4	27 13	1006.3	19 07	1015.9	690	34	19 05	200	9.3	10.5	11.2	11.2	12.1	13.6	8.0	10.3	11.8	

JUNE 1982			WAVE HEIGHTS (METERS)				FREQUENCY OF WAVE HEIGHTS (%)							
BUOY	LAT	LONG	OBS	MAX	DY HR	MEAN	<1M	1-1.5M	2-2.5M	3-3.5M	4-5.5M	6-7.5M	8-9.5M	>9.5M
41001	34.7N	072.3W	131	2.5	01 22	1.4	0.7	80.1	19.0					
41002	32.3N	075.3W	[illegible]	4.5	19 06	1.5	3.3	71.7	23.5	1.9	1.8	0.5		
41004	32.6N	078.7W	[illegible]	4.5	19 30	1.2	9.1	82.5	5.8	0.9	1.1	0.7		
41006	29.3N	077.3W	718	4.5	[illegible]	1.3	7.6	79.1	9.6	2.7	0.5			

JUNE 1982			TOTAL FREQUENCY OF WIND SPEEDS (%)							TOTAL FREQUENCY OF WIND DIRECTIONS (%)							
BUOY	LAT	LONG	CALM	<4KT	4-10KT	11-21KT	22-33KT	34-47KT	>47KT	N	NE	E	SE	S	SW	W	NW
41001	34.7N	072.3W		3.1	27.7	63.6	5.4			5.0	4.2	6.3	13.1	35.6	11.0	2.9	1.7
41002	32.3N	075.3W		2.5	26.0	58.1	2.8	0.4		4.3	7.4	14.6	9.2	29.1	27.6	4.3	3.5
41004	32.6N	078.7W		3.5	41.4	52.6	2.5			4.6	1.7	10.3	11.1	11.5	34.1	22.1	2.7

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